

Preliminary Site Investigation with Limited Soil Sampling for Proposed Residential Development at 1695 Pohuehue Road, Warkworth

Pohuehue Community Housing Limited
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Executive Summary

Haigh Workman Limited completed a desktop assessment and field investigation for the preparation of a Preliminary Site Investigation with Limited Soil Sampling for the proposed future residential development at 1695 Pohuehue Road, Warkworth.

Proposed development will comprise the placement of up to 12 relocatable dwellings with associated driveway and infrastructure on the site for use as worker accommodation and managers office.

The assessment of available information from our site walkover indicate that the following Hazardous Activities and Industries List activities have, or potentially have, occurred at the site:

- Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glasshouses or spray sheds (Cat. A.10).

Soil samples were collected from across the proposed development area in the vicinity of the horticultural activity area and analysed for Contaminants of Concern, including Metals and Organochlorine Pesticides. Laboratory analytical results reported:

- All Contaminants of Concern concentrations were below applicable Human Health criteria,
- All Contaminants of Concern concentrations were below applicable Environmental discharge criteria,
- Metals concentrations were below Regional Background Levels, and
- Organochlorine Pesticide concentrations were below laboratory Method Detection Limits in all soil samples.

Based on these findings:

- Soil sampling has confirmed that there are no significant contaminated land related constraint on development of the land for residential purposes and that it is highly likely that there is a risk to human health and the environment if the activity is undertaken on the piece of land,
- Soils are to be retained and reused on the site, soils that are required to be removed from the site could be disposed of as 'Cleanfill', with approval from the receiving landfill operator,
- The remainder of the site outside of this investigation undertaken by Haigh Workman Limited (this report) has not been assessed as land-use is not changing,
 - Any future non-production earthworks, subdivision or change of use within this area not investigated will require an investigation and possible consent requirements under National Environmental Standards guidelines, and
- During future earthworks, any visual / olfactory evidence of contamination discovered during site works must be segregated and analysed by a Suitably Qualified and Experienced Practitioner prior to disposal.

Based on the site assessment and historical information for the site, activities, that have or may have occurred at the site, the Preliminary Site Investigation with Limited Soil Sampling (this report) demonstrates that the contamination the piece of land is below background concentrations, under Regulation 5(9) of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, the 'piece of land' is not covered and the regulations do not apply to the investigation site.

Although no activities were considered as a potential source of persistent contamination, it is not possible to disqualify the potential for uncontrolled filling with unverified or unforeseen historical contamination. If unverified or materials considered to be hazardous are discovered, the site should be isolated and barriered off and Haigh Workman Limited contacted.

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

Table of Contents

Executive Summary.....	ii
1 Introduction	1
1.1 Legislative Requirements.....	1
1.2 Purpose and Scope.....	2
1.3 Limitations	2
2 Site Description	2
2.1 Proposed Development	3
3 Environmental Setting	3
3.1 Site Layout and Surrounds	3
3.2 Geology and Hydrogeology.....	3
4 Historical Information	5
4.1 Historical Aerial Photography	6
4.2 Certificates of Title	7
4.3 Contamination Enquiry	7
4.4 Property File.....	7
5 HAIL Assessment	8
6 Soil Contamination Investigation.....	8
6.1 Identified Contaminants of Concern.....	8
6.2 Soil Investigation.....	8
6.3 Soil Sampling Protocol	9
7 Regulations.....	9
7.1 National Environmental Standards	10
7.2 Auckland Unitary Plan.....	10
7.3 New Zealand Guidelines for Assessing and Managing Asbestos in Soil.....	10
8 Assessment Criteria.....	10
8.1 Human Health Assessment	10
9 Analytical Results	11
10 Quality Assurance / Quality Control	14
10.1 QA / QC Relative Percentage Difference	14

11 Discussion.....15
 11.1 Conceptual Site Model.....15
12 Regulatory Requirements16
 12.1 NES-CS.....16
13 Conclusion & Recommendations.....17
14 Unverified Material Discovery18
15 Practitioner Certifying Statement.....18

Appendices

Appendix A – Site Plan

Appendix B – Photographic Documentation

Appendix C – Historical Aerial Photography

Appendix D – Certificates of Title

Appendix E – Contamination Enquiry Request

Appendix F – Soil Sample Descriptions

Appendix G – Laboratory Analytical Results and Chain of Custody Documentation

1 Introduction

Haigh Workman Limited (Haigh Workman) were engaged by Pohuehue Community Housing Limited (the client) to undertake a Preliminary Site Investigation with Limited Soil Sampling (PSI w/ LSS) in association with the proposed residential development at 1695 Pohuehue Road, Warkworth, the 'piece of land' hereafter referred to as the 'site' is shown in Figure 1 below and provided in **Appendix A**.

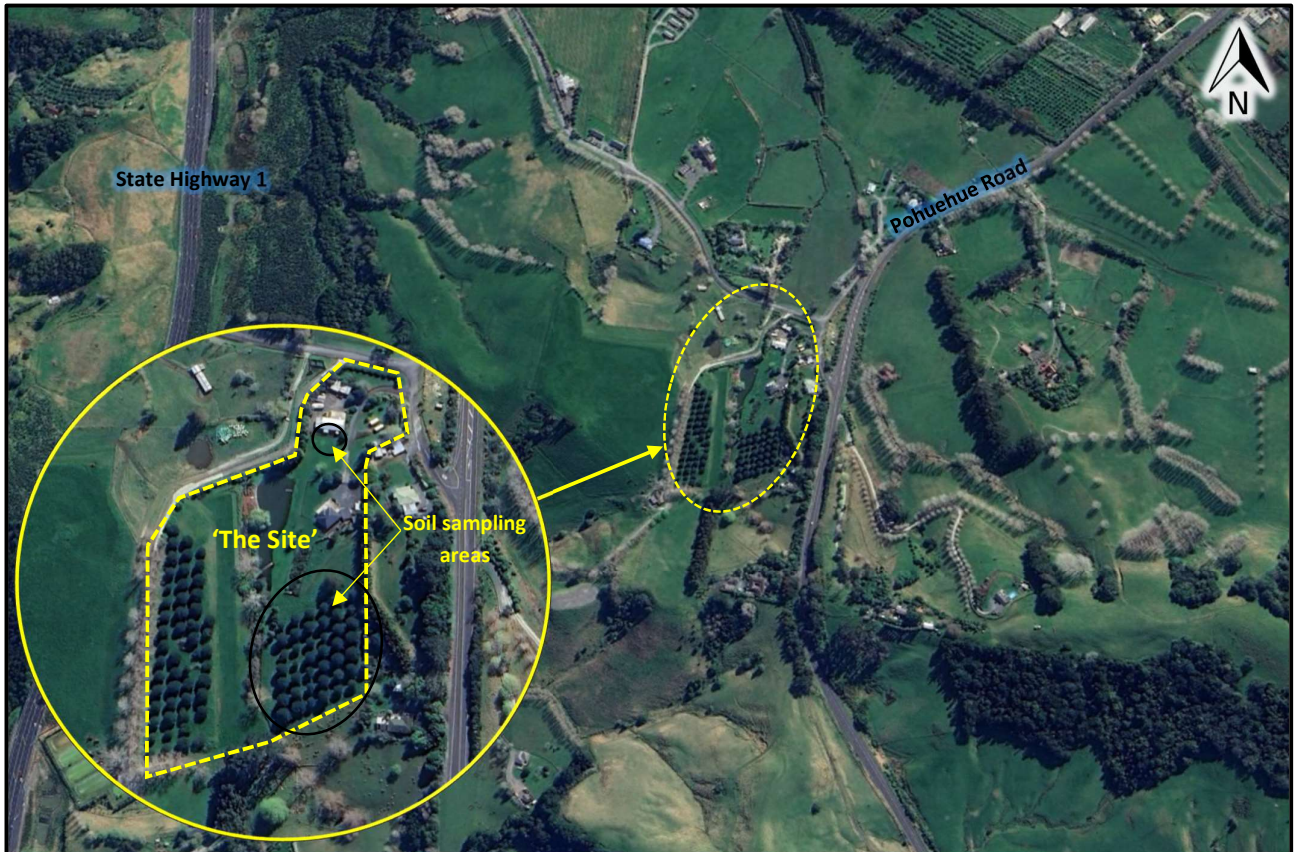


Figure 1: Site Location (Source: Google Earth Pro Website)

1.1 Legislative Requirements

An assessment has been conducted under the Hazardous Activities and Industries List (HAIL)¹ and the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations (NES-CS)².

Assessment of the land-uses and exposure scenarios has been carried out in accordance with Ministry for Environment (MfE) Contaminated Land Management Guidelines³ (CLMG), *Methodology for Deriving Contaminants for the Protection of Human Health*⁴ (Methodology) and the NES-CS.

¹ Ministry for Environment, *Hazardous Activities and Industries List (HAIL)*, March 2023.

² Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011

³ Ministry for Environment, *Contaminated Land Management Guidelines Nos. 1 to 5, 2011 (Guidelines Nos. 1 & 5, Revised 2021)*,

⁴ Ministry for Environment, *Methodology for Deriving Contaminants for Protection of Human Health*, 2011

The Auckland Council Unitary Plan (Operative in part) identifies the site as: **Future Urban Zone**

The proposed development comes under the adopted exposure scenario in the *Methodology*: **Residential (10% produce)**

1.2 Purpose and Scope

The purpose of the PSI w/ LSS investigation, under the NES-CS, is required:

1. To establish whether or not the site is HAIL or has been HAIL (it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it) (Regulation 5(7) or 6(3)), and
2. If the site is HAIL and the activity is a change of use or subdivision, to show the activity is permitted by demonstrating that it is highly unlikely that there will be a risk to human health in the particular circumstances of the site and proposed use or subdivision (Regulation 8(4)).

The investigation comprises a PSI w/ LSS, which includes the following:

- Site walkover,
- Review of available environmental investigation reports previously prepared for the site (or parts of the site),
- Review of environmental setting including topography, geology and hydrogeology,
- Review of historical aerial photographs, historical titles, Auckland Council Contamination Enquiry and Property Files,
- Collection and laboratory analysis of soil samples for identified Contaminants of Concern (CoC),
- Interpretation of laboratory analytical results, and
- PSI w/ LSS reporting (this report).

This report comprises a PSI w/ LSS prepared by Haigh Workman in general accordance with MfE guidelines for contaminated site investigations, NES-CS and Auckland Council requirements. This investigation and reporting have been prepared, reviewed and authorised by Suitably Qualified and Experienced Practitioners (SQEP), in general accordance with MfE CLMG No. 1 Reporting on Contaminated Sites in New Zealand.

1.3 Limitations

This report has been prepared by Haigh Workman for the sole benefit of Pohuehue Community Housing Limited (the client), with respect to the brief outlined to us. This report is to be used by the client and their consultants and may be relied upon when considering geo-environmental advice. Furthermore, we confirm that Auckland Council can rely on this report for the purposes of determining compliance with the NES-CS guidelines with respect to the development identified in this investigation and may be utilised in the preparation of resource consent applications with local authorities. The information and opinions contained within this report shall not be used in other context for any other purpose without prior review and agreement by Haigh Workman Limited.

The comments and opinions presented in this report are based on the findings of a desktop study, and surface conditions encountered. Responsibility cannot be accepted for any conditions not revealed by this investigation. Should conditions encountered differ to those outlined in this report we should be notified. Allowance for a review of the design should be made should ground conditions vary from these assumed.

2 Site Description

The site is located at 1695 Pohuehue Road, Warkworth. The legal descriptions for the site are provided below in Table 1. The site is shown above in Figure 1 and provided in **Appendix A**.

Table 1: Site Details

Street Address	1695 Pohuehue Road, Warkworth
Legal Description	Lot 1 DP 100471
Certificate of Title(s)	NA67C/389 (issued 21 March 1988)
Auckland Council Zoning	Future Urban Zone
Grid Reference NZ Map Grid	N 6529412.84 E 2658051.96
Approx. Site Area (m²)	28,717 m ²
'Piece of land' under investigation (m²)	5,000 m ²

2.1 Proposed Development

Based on the information provided to Haigh Workman, it is understood that the client would like to place up to 12 relocatable dwellings on the eastern half of the property for use as workers accommodation and managers office, development includes driveways and vehicle parking areas and associated infrastructure. A concept plan has been prepared by Haigh Workman Limited (dated March 2025) and is provided in **Appendix A**.

3 Environmental Setting

3.1 Site Layout and Surrounds

A site walkover was undertaken on 13 May 2025. Photographs from the 13 May 2025 site walkover are provided in **Appendix B**.

The following was observed on the site:

- The site is located approximately 2km southwest of Warkworth in a rural setting, surrounded by pastureland and horticultural land-use,
- Site access is from the northeast via Valerie Close (service road off Pohuehue Road),
- Built development comprises an existing dwelling, two farm sheds and two shipping containers (use unknown), all accessed by a gravel driveway with parking facilities,
- The balance of the site is predominantly grass, with pine nut trees to the southeast and western boundary of the site, further trees and plantings are interspersed across the site,
 - The soil sampling investigation area includes the pine nut trees and a mature pine tree on the southeast part of the site,
- An overland flow path that runs south to north through the middle of the site to a pond near the northern boundary of the site,
- The site is a gentle gully with higher slopes to the west and east of the site, gently declining towards the north, and
- The site conditions were fine during the site walkover, no areas of surface water pooling were observed.

3.2 Geology and Hydrogeology

According to the GNS Science New Zealand Geology Web Map, 1:250,000 Scale, the site is underlain by Pakiri Formation of the Warkworth subgroup (Waitemata Group), described as alternating thick-bedded, volcanic-rich, graded sandstone and siltstone. Approximately 290m to the north 390m to the south of the site the geology

changes to Middle to Late Pleistocene river and hill slope deposits of the Tauranga Group, described as predominantly pumiceous sand, silt, mud and clay with interbedded gravel and peat.

A geologic map of the site and surrounding area is provided below in Figure 3.

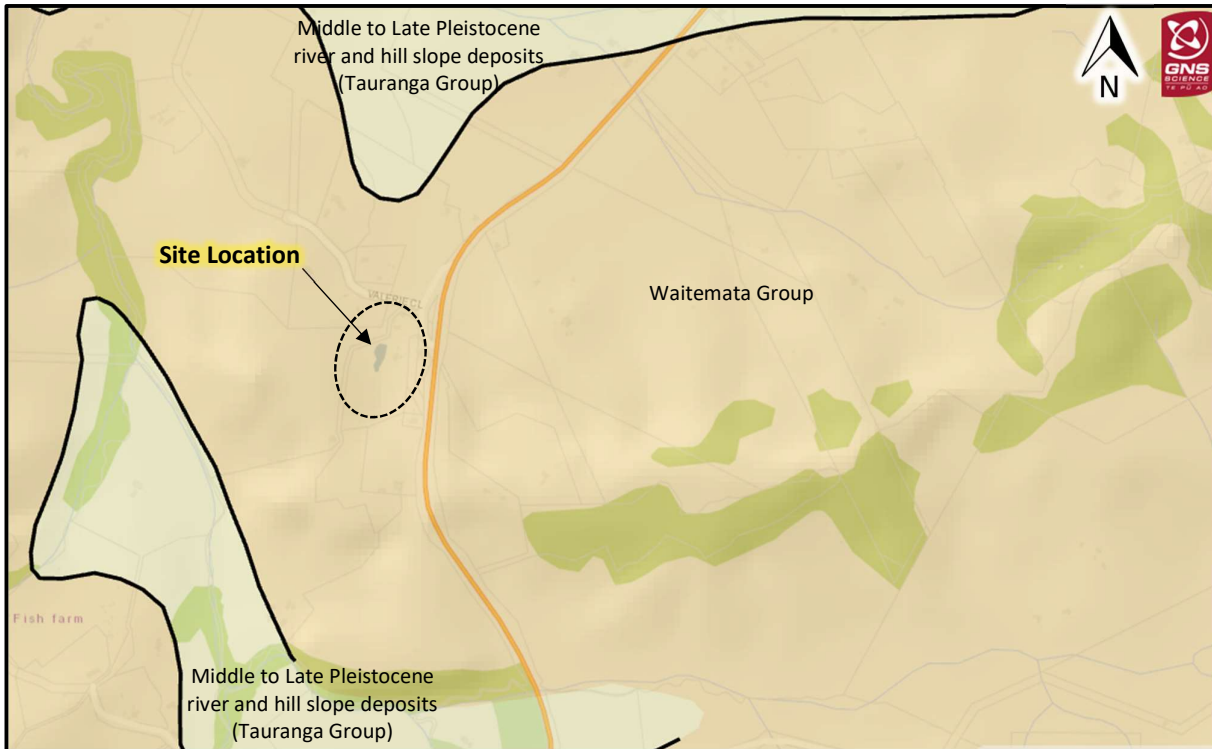


Figure 3: Geological Map (Source: GNS Sciences Geology Website)

Surface water is located on the site as a drain flowing south to north to a pond located near the middle of the site. The nearest surface water feature to the site, is the Mahurangi River located approximately 330m to the west of the site. The Mangawhai River flows to the Warkworth township then turns southeast discharging in the Mahurangi Harbour and into the Pacific Ocean.

The site is a gully with gentle slopes to the west and east and a prominent overland flowpath located in the middle of the site, flowing from south to north to a pond in the middle of the site. Surface water runoff from the site is anticipated to dissipate naturally through the vegetated area or sheet towards the overland flowpath feature.

Relevant information relating to nearby hydrological sources and potential flood risks are provided below in Table 2.

Table 1 - Hydrology and Flooding (Source: Auckland Council GIS WebMaps)

	Presence / Location	Comments
Watercourses & Water Features within 200 m (Coast, rivers, lakes)	A pond is located in the middle of the site.	-
Flood Risk	The site is shown on the Auckland Council natural hazards map as land that has flood risk through the middle of the site (via the overland flowpath).	The proposed locations of the relocatable structures are not located within the flood risk area. Flood hazard maps are provided below in Figure 4.
Private wells within 200 m	Three bores – two the northwest of site and one immediately north of the site.	No bores are located on the site. Bore (14111) is located 100m north of the site and bores (12379 and 20817) are located 25m and 140m south of the site respectively. Bores are utilised for stock and domestic supply.

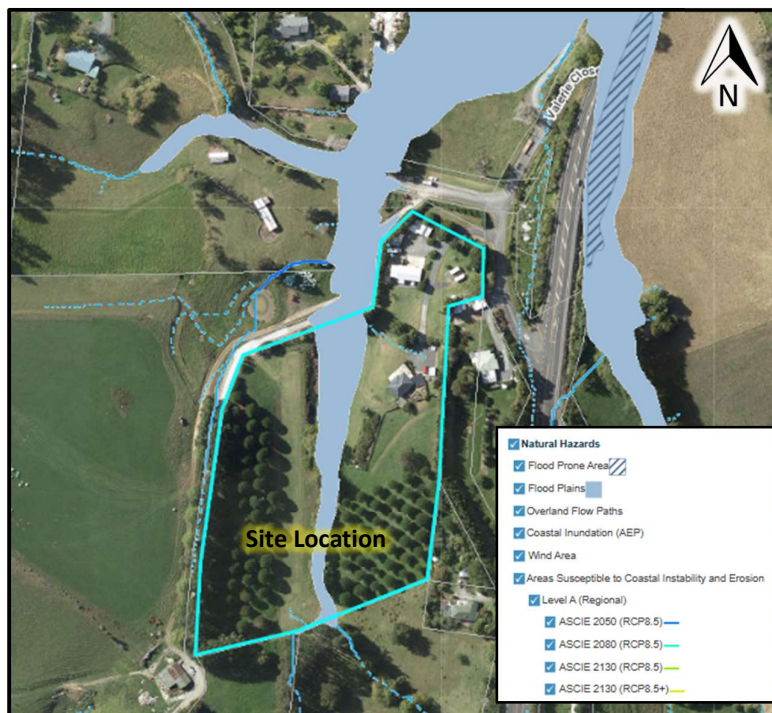


Figure 4: Flood Modelled Areas (Source: Auckland Council GIS Website)

4 Historical Information

The history of the site was established through a review of historical aerial photography, Land Information New Zealand (LINZ) Certificates of Title, Auckland Council Contamination Enquiry, and Auckland Council Property Files.

4.1 Historical Aerial Photography

Historical aerial photography of the site was obtained from the Retrolens website (<http://retrolens.nz/map>) and Google Earth Pro. Photographs available for the subject area are dated from 1963 to September 2024. A review of the historical aerial photography is provided below in Table 3. Historical aerial photographs are included in **Appendix C**.

Table 3 - Historical Aerial Photography review

Date	Source	Review
1963	Retrolens	<ul style="list-style-type: none"> The site is utilised as pastureland, with some trees located near the southern boundary of the site, An overland flow path is visible in the centre of the site flowing from south to north, A vegetated fenced off area is visible in the northwest corner of the site, The surrounding area is pasture in all directions, State Highway 1 is visible approximately 100m east of the site, and Dwellings / structures are visible immediately north, east and south of the site.
1973	Retrolens	<ul style="list-style-type: none"> The site and surrounding area are similar to the 1963 aerial photography.
1982	Retrolens	<ul style="list-style-type: none"> The site and surrounding area are similar to the 1963 and 1973 aerial photography.
1992	Retrolens	<ul style="list-style-type: none"> Earthworks is visible at the northern boundary of the site, A new accessway is visible immediately west of the site (at the sites northern boundary), and Horticultural land-use is visible to the east of the site (near the sites southern boundary).
1996	Retrolens	<ul style="list-style-type: none"> Two separate structures are visible near the northern boundary of the site (image is poor quality), and The surrounding area is similar to the 1992 aerial photography.
2006	Google Earth Pro	<ul style="list-style-type: none"> The structures are visible as farm buildings and dwelling, A pond is visible immediately west of the dwelling, and The surrounding area is similar to the 1992 and 1996 aerial photography.
2013	Google Earth Pro	<ul style="list-style-type: none"> Horticultural land-use is visible on the southern half of the site, Earthworks is visible immediately west of the overland flowpath, and A pond is visible immediately west of the site (at the sites northern boundary).
2019	Google Earth Pro	<ul style="list-style-type: none"> Earthworks is visible immediately west of the overland flowpath, further to the north of the earthworks visible in the 2013 aerial photography, and The surrounding area is similar to the 2013 aerial photography.

September 2024	Google Earth Pro	<ul style="list-style-type: none"> • Two shipping containers are visible near the northeast boundary of the site, complete with gravel accessway, and • The surrounding area is similar to the 2013 and 2019 aerial photography.
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The most recent historical aerial photograph was sourced from Google Earth Pro and is dated September 2024. Site conditions observed in the January 2024 historical aerial photograph are similar to those observed during the 13 May 2025 site walkover.

4.2 Certificates of Title

A review of Certificates of Title held by LINZ was completed for the site. No additional potential HAIL activities were identified through the title review.

Copies of the Certificates of Title are provided in **Appendix D**.

4.3 Contamination Enquiry

A site contamination enquiry was requested from the Auckland Council Contaminated Land Team.

Potential HAIL for the site identified in the Contamination Enquiry includes:

- Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glasshouses or spray (HAIL Cat. A.10).

The Contamination Enquiry identified that the site may have housed a greenhouse, Auckland Council records indicate that a consent was granted for a greenhouse in 1994.

The Contamination Enquiry also reports records of contaminated sites, closed landfills, pollution incidents, bores, industrial trade process consents and air discharges and air quality permitted activities within approximately 200m of the site.

No bores are located on the site. The following Bore / Bore Consents have been issued for properties within 200m of the site:

- Bore Consent Number 14111 – located approximately 100m north of the site for stock and domestic supply,
- Bore Consent Number 12379 – located approximately 25m south of the site for stock and domestic supply, and
- Bore Consent Number 20817 – located approximately 140m south of the site for stock and domestic supply.

Based on information in the Contamination Enquiry, no further activities considered likely to cause contamination at the site were identified within 200m.

A copy of the Contamination Enquiry is attached in **Appendix E**

4.4 Property File

A Property File request was lodged with Auckland Council. Relevant information including Resource Consents and Building Consents / Permits issued for developments that have occurred on-site is summarised below in Table 4 and are available on request, due to the large file size of the documents.

Table 4 – Relevant Property Files

Date	Details	Owner / Applicant	Description
March 1994	Building Consent Application (ABA940537).	Anthony Marsden	Application and drawings for the construction of a shed for farm implements.
September 1994	Building Consent Application (ABA941898).	Anthony Marsden	Application and drawings for the construction of a greenhouse for horticultural use.
January 2002	Building Consent Application (ABA20007).	Anthony Marsden	Application for the relocation of existing dwelling and carport from existing location to new location within the site.
November 2014	Resource Consent Application (LAN-63420).	Anthony Marsden	Application for the construction of a minor dwelling.

5 HAIL Assessment

Based on previous land-use and development information for the property, Table 5 below summarises the potential for contamination associated with previous site activities and land-uses classified under the HAIL.

Table 5 – Site Activities / Land Uses and Potential HAIL categories

Date	HAIL Activity	Primary Source	Potential Contaminants	Investigation Locations
c. 1994 – present	A.10 - Persistent pesticide storage or use including sport turfs, market gardens, orchards, glass houses or spray houses.	Site walkover, Aerial Photography and Auckland Council Contamination Enquiry	Metals and OCP	Current horticultural land-use area and former greenhouse site

6 Soil Contamination Investigation

6.1 Identified Contaminants of Concern

The site was identified for potential soil contamination during the review of historical documents and the 13 May 2025 site walkover. Relevant to the HAIL assessment and site history, the potential CoC for the site investigation area included:

- Metals, and
- Organochlorine Pesticides (OCP).

6.2 Soil Investigation

Soil sampling from the site investigation area was undertaken on 13 May 2025 and comprised soil sampling by a SQEP from Haigh Workman. Sampling locations are provided in **Appendix A**. Photographic documentation from the investigation is provided in **Appendix B**.

Minor ground disturbance for sampling activities was conducted as a permitted activity under NES-CS regulation 8(2), where soil sampling is defined within regulation 5(3).

Soil sampling consisted of targeted sampling of the current horticultural land-use area and the location of the former greenhouse site, where future residential development is proposed.

Ten shallow soil samples were collected, including one duplicate soil samples for Quality Assurance / Quality Control (QA / QC) purposes, were submitted to the laboratory (Hill Laboratories) for analysis of Metals and OCP.

The exposure scenarios for the priority contaminants listed in Section 6.1 include soil ingestion, dermal exposure, and inhalation, soil samples were retrieved from below the surface between 0 – 0.075m bgl.

- Encountered sub-surface soil comprised natural topsoil soils, comprising of brown silt material.

Soil sample descriptions are provided in **Appendix F**.

During the fieldwork access was made available to Haigh Workman across the whole investigation area.

6.3 Soil Sampling Protocol

Soil samples were collected from a spade or hand trowel (between 0 – 0.075m bgl) from nine locations across the proposed development area. Soil sampling equipment was decontaminated between sampling locations and disposable nitrile gloves were used and replaced between sampling locations in order to prevent cross-contamination. All samples were collected in accordance with strict environmental sampling protocols to ensure reliable and representative results.

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

6.3.1 Duplicate samples

A duplicate sample involves collecting two separate samples from a single sample location, storing these in separate containers, and submitting them for analysis to the laboratory as two separate samples. Samples are given separate sample numbers so the laboratory is unaware that the sample is a duplicate.

A duplicate sample measures the contaminant concentration difference between the two samples because of soil heterogeneity, the variability or error within the laboratory analysis and the variability or error related to field sampling technique. The results of duplicate variance analysis are presented in Section 10.1. One duplicate for every 20 results was adopted.

7 Regulations

In the Auckland Region, investigations and potentially contaminated sites are governed by rules under:

- MfE NES-CS and Petroleum Hydrocarbon Guidelines (PHG) – National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (MfE, 2012) and Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE, revised 2011),
- AUP – Auckland Unitary Plan (2024), and

- New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017).

7.1 National Environmental Standards

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) 2011) Regulations, came into force on 1 January 2012, with Contaminated Land Management Guidelines revised in 2011 (No.2) and 2021 (No. 1 and 5). The NES-CS for contaminants in soil incorporates by reference MfE contaminated land documents, including MfE Contaminated Land Management Guidelines for the investigation, assessment and reporting of contaminated land within New Zealand. These documents are aimed to provide national consistency in the reporting of contaminated site information. These documents are:

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

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

7.2 Auckland Unitary Plan

The Auckland Unitary Plan is the key resource management document for Auckland under the Resource Management Act (RMA, 1991). Matters relating to contaminated land can be referred from:

- Regional Policy Statement (B10.4 Land – Contamination), and
- Chapter E Auckland – wide, Environmental Risk (E.30 Contaminated Land).

7.3 New Zealand Guidelines for Assessing and Managing Asbestos in Soil.

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

Soil samples collected were not analysed for Asbestos as part of this investigation.

8 Assessment Criteria

8.1 Human Health Assessment

The site is zoned 'Future Urban'. The proposed development for the site includes the placement of relocatable dwellings and construction of a driveway network on the eastern part of the site.

For this assessment, soil analytical results were compared against:

- NES-CS Human Health criteria for Residential (10% produce) land-use, and
- AUP Environmental Discharge criteria.

Due to the Waitemata Group soils encountered beneath the site, soil analytical results were also compared against:

- Auckland Region Background Levels for non-volcanic soils.

9 Analytical Results

Ten shallow soil samples were collected, including one duplicate soil samples for Quality Assurance / Quality Control (QA / QC) purposes, were submitted to the laboratory (Hill Laboratories) for analysis of Metals and OCP.

Laboratory analytical results reported:

- All CoC concentrations were below applicable MfE NES-CS Residential (10% produce) Human Health criteria,
- All CoC concentrations were below applicable AUP Environmental Discharge criteria,
- Metals concentrations were below Regional Background levels, and
- OCP concentrations were below laboratory method detection limits (MDL) in all soil samples.

Laboratory analytical results are summarised below in Table 6. Soil sampling locations are provided in Haigh Workman Drawing 25 050 / 2 provided in **Appendix A**. Laboratory analytical results and COC documentation are provided in **Appendix G**.

Table 6 – Soil Analytical Results

Sample Reference		Test Analysis Levels (mg/kg)					MfE	AUP ²	Background Level (non-volcanic) ³
		POH-SS01	POH-SS02	POH-SS03 (duplicate of POH-SS02)	POH-SS04	POH-SS05	NES ¹		
Sample Soil Type		SILT (Topsoil)							
Sample Date		13 May 2025							
Sample Depth (m)		0-0.075	0-0.075	0-0.075	0-0.075				
Metals	As	3	3	2	2	3	20	100	12
	Cd	0.21	0.26	0.24	0.14	0.18	3	7.5	0.65
	Cr	19	19	18	9	10	460	400	55
	Cu	10	7	6	7	6	10,000	325	45
	Pb	8	7	6.1	8.3	9.8	210	250	65
	Ni	2	2	2	< MDL	< MDL	400 ⁴	105	35
	Zn	18	13	14	47	13	7,400 ⁴	400	180
OCP	∑DDT	< MDL	< MDL	< MDL	< MDL	< MDL	45	12	-
	Aldrin	< MDL	< MDL	< MDL	< MDL	< MDL	1.1	-	-
	Dieldrin	< MDL	< MDL	< MDL	< MDL	< MDL	1.1	-	-
	Lindane	< MDL	< MDL	< MDL	< MDL	< MDL	139 ⁵	-	-

		Test Analysis Levels (mg/kg)					MfE	AUP ²	Background Level (non-volcanic) ³
Sample Reference	POH-SS06	POH-SS07	POH-SS08	POH-SS09	POH-SS10	NES ¹			
Sample Soil Type	SILT (Topsoil)								
Sample Date	13 May 2025								
Sample Depth (m)	0-0.075	0-0.075	0-0.075	0-0.075	0-0.075				
Metals	As	2	2	3	< MDL	< MDL	20	100	12
	Cd	0.25	0.19	0.21	0.15	0.18	3	7.5	0.65
	Cr	20	14	10	8	10	460	400	55
	Cu	8	6	6	4	6	10,000	325	45
	Pb	6.5	6.9	7.3	4.2	5.8	210	250	65
	Ni	2	2	< MDL	< MDL	< MDL	400 ⁴	105	35
	Zn	14	13	20	8	19	7,400 ⁴	400	180
OCP	∑DDT	< MDL	< MDL	< MDL	< MDL	< MDL	45	12	-
	Aldrin	< MDL	< MDL	< MDL	< MDL	< MDL	1.1	-	-
	Dieldrin	< MDL	< MDL	< MDL	< MDL	< MDL	1.1	-	-
	Lindane	< MDL	< MDL	< MDL	< MDL	< MDL	139 ⁵	-	-

Notes: < MDL: below laboratory method detection limit.

Concentration: Values below accepted Background Levels (Metals) and / or laboratory MDL (OCP).

Concentration: Values above accepted Background Levels and / or laboratory MDL but in compliance with relevant criteria.

Concentration: Values above relevant acceptance criteria.

¹ NES – MfE NES Human Health Criteria for Residential (10% produce) Use (MfE, 2012).

² AUP (Operative in Part) - Table E.30.6.1.4.1, Permitted Activity Soil Acceptance Criteria for Environmental Discharge (AUP, 2024).

³ Auckland Regional Council Technical Publication No.153 – Expected naturally occurring background concentrations of inorganic elements in (non-volcanic) soils in the Auckland Region.

⁴ Australian Health-Based Investigation Levels for Residential (A) use (NEPC, revised 2013), applied in accordance with MfE Contaminated Land Guidelines No.2.

⁵ MfE Soil Guidelines for Former Sheep-Dip Sites for Standard Residential sites (MfE, 2006).

10 Quality Assurance / Quality Control

Quality assurance (QA) and quality control (QC) are essential elements for site investigation. QA relates to the planned activities implemented so that quality requirements will be met, and QC relates to the observation techniques and activities used to demonstrate the quality requirements have been met. Soils were inspected for visual and olfactory indicators of contamination and logged and are attached in **Appendix F**.

Between samples equipment was decontaminated by brushing, spraying with clean potable water and rinsing with high purity de-ionised water. To reduce the potential for cross-contamination, each sample was taken using disposable nitrile gloves that were discarded following the collection of each sample.

Appropriate Personal Protective Equipment (PPE) was used by Haigh Workman staff including disposable nitrile gloves, highly visible vest and steel toe capped boots. All disposable PPE was treated as contaminated and disposed of appropriately.

Soil samples were placed in sample containers supplied by Eurofins Laboratories, which were then capped, labelled with a unique identifier and placed in a chilly bin prior to transport by Courier. Standard chain of custody documentation is enclosed in **Appendix G**.

Any laboratory analysing samples of contaminated media must be able to show it has in-house quality assurance procedures and quality control checks (QA / QC) to ensure accurate testing and reporting of analyses. IANZ, or equivalent overseas accreditation, provides confidence that the receiving laboratory has appropriate QA / QC procedures in place. Hill Laboratories Limited⁵ is IANZ and NZS/ISO/IEC 17025:2018 accredited, and was the laboratory elected for testing.

Following receipt of the samples by Hill Laboratories, the samples were scheduled for analysis of the identified contaminants of concern. Records of laboratory QA / QC and the results of chemical testing including methodologies as received from the laboratory and Chain of Custody documentation, are presented in **Appendix G**.

10.1 QA / QC Relative Percentage Difference

One duplicate soil sample set (POH-SS03 as a duplicate sample of POH-SS02) was collected for QA / QC purposes. The duplicate soil samples were collected using the same soil sampling procedures and analysed at the laboratory (Hills) using the same sample preparation and analysis procedures as the original soil samples. One QA / QC sample was collected for every 20 soil samples collected.

⁵ Hill Laboratories Limited, an IANZ⁵ and NZS/ISO/IEC 17025:2018⁵ accredited laboratory incorporating the aspects of ISO 9000:2015⁵ relevant to testing laboratories. International Accreditation New Zealand which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). New Zealand Standard, General Requirements for the Competence of Testing and Calibration Laboratories, 2018. ISO9000: Quality Management Systems.

Relative Percentage Difference (RPD) calculations for analytes reported above the laboratory MDL ranged from 0 to 40%. RPD values for the duplicate pairs met Haigh Workman QA / QC acceptance criteria of less than 50%.

QA / QC results are presented in Table 7 below. Laboratory analytical results are provided in **Appendix G**.

Table 7 – Quality Assurance / Quality Control Results

Contaminants of Concern		Results (mg/kg)		RPD (%)
		POH-SS02	POH-SS03	
Metals	As	3	2	40
	Cd	0.26	0.24	8
	Cr	19	18	5.4
	Cu	7	6	15.4
	Pb	7	6.1	13.7
	Ni	2	2	0
	Zn	13	14	7.4
OCP	ΣDDT	< MDL	< MDL	-
	Aldrin	< MDL	< MDL	-
	Dieldrin	< MDL	< MDL	-
	Lindane	< MDL	< MDL	-

MDL – Method Detection Limit

mg/kg – milligrams per kilogram

RPD – Relative Percentage Difference

11 Discussion

11.1 Conceptual Site Model

The assessment provided below in Table 8 expands on the potential sources of contamination identified within the area of the proposed residential development and exposure pathways. It is based on the potential effects of the proposed land-use and soil disturbance activities on human health and the environment associated with the Residential (10% produce) land-use.

Soil sampling has confirmed that there are no significant contaminated land related constraint on redevelopment of the land for residential purposes and that it is highly unlikely that there is a risk to human health if the activity is done to the piece of land.

Table 8 – Conceptual Site Model

Potential Source	Potential Receptors	Potential Pathways	Assessment
CoC across remainder of the site (below Background criteria and / or laboratory MDL)	Construction, maintenance / excavation workers / future site user(s).	Inhalation of dust / ingestion / dermal contact with exposed soils.	Incomplete Pathway: Contaminant concentrations are below applicable Human Health criteria.
	Ecological receptors. <i>(Pond is located near the middle of the site).</i>	Sediment, dust and surface water during earthworks.	Incomplete Pathway: Contaminant concentrations are below applicable Environmental Discharge criteria.

12 Regulatory Requirements

12.1 NES-CS

The NES-CS describes a ‘piece of land’ as the piece of land that has had, currently has, or most likely has had activities listed on the HAIL and soil disturbance is proposed. The proposed development will comprise site works where soils will be disturbed and will remain on the site.

Based on the historical information for the site, activities, that have or may have occurred at the site and that the PSI investigation (this report) demonstrates that the contamination the piece of land is below background concentrations, under Regulation 5(9) of the NES-CS, the ‘piece of land’ is not covered and the regulations do not apply to the investigation site.

Table 9 below presents potential Resource Consent requirements for the proposed activity. This investigation presents factual information for the site. Matters of control and discretion, however, rest with the consenting authority (Auckland Council) based on their assessment of this report. It would be appropriate to seek clarification from Auckland Council or an Environmental Planning Specialist for further information on resource consenting requirements.

Table 9 – Potential Resource Consent Requirements

Potential Source	Potential Applicable Planning Rules
National Environmental Standards (NES)	DO NOT APPLY – LAND NOT COVERED, under Regulation 5 (subclause 9) <ul style="list-style-type: none"> A PSI (this investigation) has been prepared for the site, and Concentrations of target contaminants are below Background Level Concentrations.
Auckland Unitary Plan	PERMITTED ACTIVITY (Chapter E30.6.1) <ul style="list-style-type: none"> A PSI (this investigation) has been prepared for the site, and Concentrations of target contaminants were below AUP Environmental Discharge criteria and Background Levels. Conditions of Chapter E30.6.1 must be complied with.

The remainder of the site (western half of the property) outside of this investigation undertaken by Haigh Workman Limited (this report) has not been assessed as land-use is not changing. Any future non-production earthworks, subdivision or change of use within this area not investigated will require an investigation and possible consent requirements under the NES-CS.

13 Conclusion & Recommendations

This PSI w/ LSS was carried out for the investigation site in accordance with the scope of work and current applicable regulations. This report has been prepared in accordance with MfE Guidelines for Contaminated Site Investigations, NES-CS guidelines and Auckland Council requirements. This investigation and reporting have been prepared, reviewed and authorised by a SQEP, as required under the NES-CS.

Proposed development will comprise the placement of up to 12 relocatable dwellings on the eastern half of the site for use as workers accommodation and managers office, with associated driveways and infrastructure.

Historical information available for the site and observations from the 13 May 2025 site walkover indicate that the following HAIL activities have, or potentially have occurred at the site:

- HAIL Cat. A.10 – Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glasshouses or spray sheds,
 - The site has been utilized as historically as an orchard (c. 2006 – present) and a greenhouse was onsite between 1996 – 2000.

Ten shallow soil samples were collected, including one duplicate soil samples for QA / QC purposes, were submitted to the laboratory (Hill Laboratories) for analysis of Metals and OCP.

Laboratory analytical results reported:

- All CoC concentrations were below applicable MfE NES Residential (10% produce) Human Health criteria,
- All CoC concentrations were below applicable AUP Environmental Discharge criteria,
- Metals concentrations were below Regional Background Levels, and
- OCP concentrations were below laboratory MDL in all soil samples.

Based on these findings:

- Soil sampling has confirmed that there are no significant contaminated land related constraint on development of the land for residential purposes and that it is highly likely that there is a risk to human health and the environment if the activity is undertaken on the piece of land,
- Soils are to be retained and reused on the site, soils that are required to be removed from the site could be disposed of as 'Cleanfill', with approval from the receiving landfill operator,
- The remainder of the site outside of this investigation undertaken by Haigh Workman (this report) has not been assessed as land-use is not changing,

- Any future non-production earthworks, subdivision or change of use within this area not investigated will require an investigation and possible consent requirements under NES-CS guidelines, and
- Any visual / olfactory evidence of contamination discovered during site works must be segregated and analysed by a SQEP prior to disposal.

Based on the site assessment and historical information for the site, activities, that have or may have occurred at the site, the PSI w/ LSS (this report) demonstrates that the contamination the piece of land is below background concentrations, under Regulation 5(9) of the NES-CS, the 'piece of land' is not covered and the regulations do not apply to the investigation site.

Although no activities were considered as a potential source of persistent contamination, it is not possible to disqualify the potential for uncontrolled filling with unverified or unforeseen historical contamination. If unverified or materials considered to be hazardous are discovered, the site should be isolated and barriered off and Haigh Workman contacted.

14 Unverified Material Discovery

Should visual and / or olfactory evidence of gross contamination be identified during excavation works. It is recommended that works cease in that area and a SQEP familiar with the site attends to inspect the impacted soils. If required, the SQEP will undertake sampling to confirm the level and scope of contamination. The area should also be physically isolated using a high visibility fence if practicable.

Indications that uncontrolled filling with waste and / or unverified material may have occurred on site include:

- Buried Rubbish,
- Buried construction or demolition waste,
- Unanticipated soil colours or odours,
- Buried tanks or drums, and
- Encountering materials that may contain Asbestos, including fibrous building materials and fibre cement construction products.

Site management should brief operatives onsite of the above signs during site inductions.

15 Practitioner Certifying Statement

I, Aaron Thorburn of Haigh Workman Limited certify that:

This Preliminary Site Investigation meets the requirements of the Resource Management (National Environmental Standard for assessing and managing contaminants in soil to protect human health) Regulations 2011 because it has been:

- Undertaken by a Suitably Qualified and Experienced Practitioner,
- Site investigations have been undertaken in accordance with the current edition of the Contaminated Land Management Guidelines No. 5 – Site Investigation and Analysis of Soils,

- Reported on in accordance with the current edition of the Contaminated Land Management Guidelines No. 1 – Reporting on contaminated sites in New Zealand, and
- The report has been certified by a Suitably Qualified and Experienced Practitioner.

This report concludes that the results of the ground investigations are below the applicable standards outlined in Regulation 7 of the NES-CS.

Based on the information reviewed, this PSI with Limited Sampling investigation demonstrates that contamination on the piece of land is below background concentrations, under Regulation 5(9) of the NES-CS, the land is not covered and the NES-CS regulations do not apply to the investigation site.

I have completed a Bachelor of Applied Science (Environmental). I have over 10 years' experience in contaminated land management across New Zealand.

End of Report – Appendices to follow.

Appendix A – Site Plans

Drawing No.	Title
25 050 / 1	Site Location Plan
25 050 / 2	Sample Location Plan
25 050 / 3	Proposed Concept Plan



25 050 / 1 – Site Location



25 050 / 2 – Site Sampling Plan

Appendix B – Photographic Documentation



Photograph 1: View from the middle of the site on the eastern boundary looking west towards the pond and pastureland beyond.



Photograph 2: View from the middle of the site on the southern boundary looking west towards the orchard trees (pine nuts) in the distance and the overland flowpath (flowing south to north) in the foreground.



Photograph 3: View from the southern end of the pond looking southeast towards the orchard trees in the distance (investigation area).



Photograph 4: View from near the southeast corner of the site looking north through the orchard trees towards the existing dwelling in the distance.



Photograph 5: View of the pond located in the middle of the site, the farm shed is visible near the top right of the photograph. The grassed area immediately south of this shed was the location of the former greenhouse (1996-2000).



Photograph 6: View from the farm shed and associated water tank near the northern boundary of the site looking towards the west. The grassed area is the general location of the former greenhouse. Near the top left of the photograph is the pond.

Appendix C - Historical Aerial Photography

NOTE: Site boundaries indicative only



Retrolens
1963



Retrolens
1973



Retrolens
1982



Retrolens
1992



Google Earth Pro
1996









Google Earth Pro
September 2024

Appendix D – Certificate of Title



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**




R. W. Muir
Registrar-General
of Land

Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier NA67C/389
Land Registration District North Auckland
Date Issued 21 March 1988

Prior References
NA54C/1458

Estate Fee Simple
Area 2.8714 hectares more or less
Legal Description Lot 1 Deposited Plan 100471
Original Registered Owners
Anthony Bryan Marsden and Sharyn Lee Marsden

Interests

B149523.1 Compensation Certificate The Minister of Works and Development - 16.2.1983 at 1.30 pm
Appurtenant hereto is a right of way created by Transfer B678701.3
C551941.4 Mortgage to ANZ Banking Group (New Zealand) Limited - 16.12.1993 at 2.49 pm
C991193.1 Variation of Mortgage C551941.4 - 7.5.1996 at 11.29 am
D422874.1 NOTICE OF CLAIM PURSUANT TO SECTION 42 MATRIMONIAL PROPERTY ACT 1976 AGAINST THE INTEREST OF ANTHONY BRYAN MARSDEN BY SHARYN LEE MARSDEN - 23.8.1999 AT 2.28 PM
5602091.1 Withdrawal of Notice of Claim D422874.1 - 28.5.2003 at 9:00 am
5602091.2 Discharge of Mortgage C551941.4 - 28.5.2003 at 9:00 am
5602091.3 Transfer to Anthony Bryan Marsden - 28.5.2003 at 9:00 am
5602091.4 Transfer to Anthony Bryan Marsden and Tania Jane Marsden - 28.5.2003 at 9:00 am
5602091.5 Mortgage to Mortgage Holding Trust Company Limited - 28.5.2003 at 9:00 am
9411123.1 Discharge of Mortgage 5602091.5 - 30.5.2013 at 11:53 am
9411123.2 Mortgage to Westpac New Zealand Limited - 30.5.2013 at 11:53 am

References

Prior C/T 54C/1458

Transfer No.

N/C. Order No. B.796969.1

Land and Deeds 69



REGISTER

No. 67C/389

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 21st day of March one thousand nine hundred and eighty-eight under the seal of the District Land Registrar of the Land Registration District of NORTH AUCKLAND

WITNESSETH that ROY HACKETT COTTERALL LIMITED at Auckland

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 2.8714 hectares more or less being Lot 1 Deposited Plan 100471 and being part Allotments 73, 219 and 221 Parish of Mahurangi.



Assistant Land Registrar

Interests at date of issue:-

corrected 23/11/93 S.M.

K115215 Compensation Certificate against part by the Minister of Works and Development - 9.8.1963 at 1.37 oc.

C.446093.1 Variation of terms of Mortgage B.796969.4 - 18.1.1993 at 11.56 o'c

B.149523.1 Compensation Certificate against part by the Minister of Works and Development - 16.2.1983 at 1.30 oc.

C.551941.3 Transfer to Anthony Bryan Marsden automotive engineer and Sharyn Lee Marsden accounts executive both of Taupo - 16.12.1993 at 2.49 o'c

Appurtenant hereto is a right of way over part Lot 2 Plan 104972 (C.T.57D/1171) created by Transfer B.678701.3.

C.551941.4 Mortgage to ANZ Banking Group (New Zealand) Limited - 16.12.1993 at 2.49 o'c

B.796969.2 Transfer to Karen Teresa Letica of Warkworth housewife - 21.3.1988 at 2.40 oc.

C.991193.1 Variation of terms of Mortgage No. C.551941.4 produced 7-5-1996 at 11-29 oc

B.796969.3 Mortgage to The Housing Corporation of New Zealand - 21.3.1988 at 2.40 oc.

B.796969.4 Mortgage to The Housing Corporation of New Zealand - 21.3.1988 at 2.40 oc.

D422874.1 NOTICE OF CLAIM OF INTEREST UNDER SECTION 42(2) MATRIMONIAL PROPERTY ACT 1976 AGAINST THE INTEREST OF ANTHONY BRYAN MARSDEN BY SHARYN LEE MARSDEN 23.8.1999 AT 2.28

Measurements are Metric

for RGL

No. 67C/389

AC

Appendix E – Auckland Council Contamination Enquiry

15 May 2025

Haigh Workman Limited
3 Elizabeth Street
AUCKLAND
Attention: Ellen Cole

Dear Ellen,

Site Contamination Enquiry – 1695 Pohuehue Road, Warkworth

This letter is in response to your enquiry requesting available site contamination information within Auckland Council records for the above site. Please note this report does not constitute a site investigation report; such reports are required to be prepared by a (third-party) Suitably Qualified and Experienced Practitioner.

The following details are based on information available to the Contamination, Air & Noise Team in the Planning & Resource Consent Department. The details provided may be from former regional council information, as well as property information held by the former district/city councils. For completeness the relevant property file should also be requested to obtain all historical records and reports via 09 3010101 or online at:

<https://www.aucklandcouncil.govt.nz/buying-property/order-property-report/Pages/order-property-file.aspx>.

1. Hazardous Activities and Industries List (HAIL) Information

This list published by the Ministry for the Environment (MfE) comprises activities and industries that are considered likely to cause land contamination as a result of hazardous substance use, storage, and/or disposal.

Council's records indicate this site has possibly been subject to the following activity that fall within the HAIL:

- HAIL Item (A10) - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds

Records indicate the site 1695 Pohuehue Road Warkworth, may have housed a greenhouse. Records indicate that a consent was granted for a greenhouse in 1994.

Please note:

- *If you are demolishing any building that may have asbestos containing materials (ACM) in it, you have obligations under the Health and Safety at Work (Asbestos) Regulations 2016 for the management and removal of asbestos, including the need to engage a Competent Asbestos Surveyor to confirm the presence or absence of any ACM.*
- *Paints used on external parts of properties up until the mid-1970's routinely contained lead, a poison and a persistent environmental pollutant. You are advised to ensure that soils affected by old, peeling or flaking paint are assessed in relation to the proposed use of the property, including high risk use by young children.*

2. Consents and Incidents Information (200m radius of the selected site)

The Council database was searched for records of the following activities within approximately 200 metres of the site and results are displayed in Figure 1 below:

- Pollution Incidents (including air discharges, oil or diesel spills)
- Bores
- Contaminated site and air discharges, and industrial trade process consents
- Closed Landfills
- Air quality permitted activities
- Identified HAIL activities

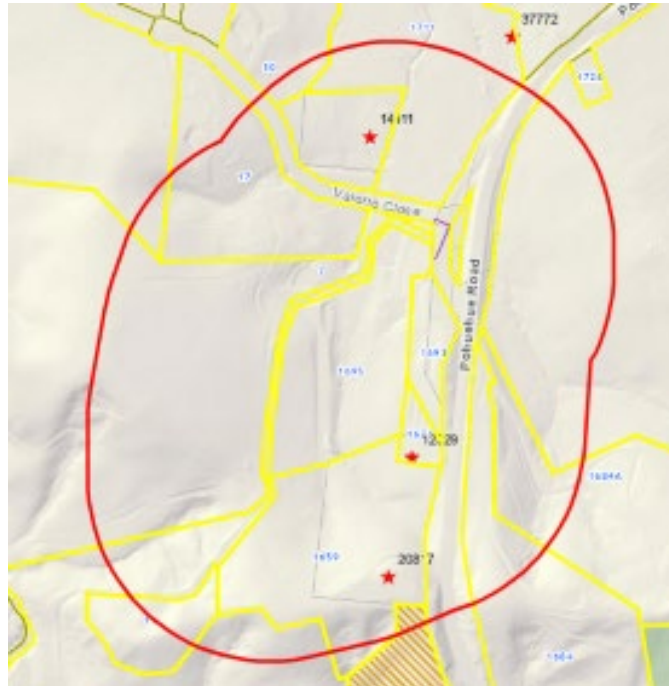


Figure 1: Selected Consents, Incidents and HAIL activities within approximately 200m of the subject site

Legend:

All Consents +	Closed Landfill (Auckland Council owned) □
All Applications ■	Closed Landfill (Privately owned) ■
All Permitted Activities *	All Incidents ●
All Bores ★	HAIL activities ▨

Relevant details of any consents and HAIL activities are appended to this letter (Attachment A). Please refer to the column titled 'Property Address' on the spreadsheet to aid in identifying corresponding data on the map.

For any identified HAIL sites, please refer to the tab "HAIL activities" for more information (Column C and D include HAIL activity details where these are available).

Please note:

The HAIL activity hatching in Figure 1 only reflects whether a site has been identified as a HAIL site (both verified and non-verified) by the Council and the type of HAIL associated with the site. This does not confirm whether the site has been formally investigated or the contamination status of the property (e.g. contaminated, remediated etc.). Additionally, due to limitations within Council's records, the specific HAIL activity is not included in the data for all properties. For further information on any of these known HAIL sites, a subsequent site contamination enquiry can be lodged for the specific property (up to 5 adjacent properties can be covered in one request).

While the Auckland Council has carried out the above search using its best practical endeavours, it does not warrant its completeness or accuracy and disclaims any responsibility or liability in respect of the information. If you or any other person wishes to act or to rely on this information, or make any financial commitment based upon it, it is recommended that you seek appropriate technical and/or professional advice.

If you wish to clarify anything in this letter that relates to this site, please contact contaminatedsites@aucklandcouncil.govt.nz. Any follow up requests for information on other sites must go through the online order process.

Should you wish to request any of the files referenced above and/or listed in the attached spreadsheet for viewing, please contact the Auckland Council Call Centre on 301 0101 and note you are requesting former Auckland Regional Council records (the records department requires three working days' notice to ensure the files will be available).

Please note Auckland Council cost recovers officer's time for all site enquiries. As such an invoice for the time involved in this enquiry will follow shortly.

Yours Sincerely,

**Contamination, Air and Noise Team
Specialist Unit | Planning & Resource Consents
Auckland Council**

Appendix F – Soil Descriptions

Date	Sample #	Depth (m bgl)	Soil Description	Analysis
13 May 2025	POH-SS01	0-0.075	SILT, dry, friable, brown to dark brown (Topsoil)	Metals and OCP
	POH-SS02	0-0.075		
	POH-SS03 (dup of POH-SS02)	0-0.075		
	POH-SS04	0-0.075		
	POH-SS05	0-0.075		
	POH-SS06	0-0.075		
	POH-SS07	0-0.075		
	POH-SS08	0-0.075		

SS – Soil Sample dup – Duplicate sample m bgl – meters below ground level OCP – Organochlorine Pesticides

Appendix G – Laboratory Analytical Results and Chain of Custody Documentation

Certificate of Analysis

Page 1 of 3

Client:	Haigh Workman Limited	Lab No:	3888618	SPV1
Contact:	Aaron Thorburn C/- Haigh Workman Limited PO Box 89 Kerikeri 0245	Date Received:	15-May-2025	
		Date Reported:	16-May-2025	
		Quote No:	135990	
		Order No:	25050	
		Client Reference:	Pohuehue Rd	
		Submitted By:	Aaron Thorburn	

Sample Type: Soil						
Sample Name:		POH-SS01 13-May-2025	POH-SS02 13-May-2025	POH-SS03 13-May-2025	POH-SS04 13-May-2025	POH-SS05 13-May-2025
Lab Number:		3888618.1	3888618.2	3888618.3	3888618.4	3888618.5
Individual Tests						
Dry Matter	g/100g as rcvd	76	66	64	67	64
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	3	2	2	3
Total Recoverable Cadmium	mg/kg dry wt	0.21	0.26	0.24	0.14	0.18
Total Recoverable Chromium	mg/kg dry wt	19	19	18	9	10
Total Recoverable Copper	mg/kg dry wt	10	7	6	7	6
Total Recoverable Lead	mg/kg dry wt	8.0	7.0	6.1	8.3	9.8
Total Recoverable Nickel	mg/kg dry wt	2	2	2	< 2	< 2
Total Recoverable Zinc	mg/kg dry wt	18	13	14	47	13
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
alpha-BHC	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
beta-BHC	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
delta-BHC	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
4,4'-DDD	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
4,4'-DDE	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
2,4'-DDT	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
4,4'-DDT	mg/kg dry wt	0.055	< 0.015	< 0.016	< 0.015	< 0.016
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.09	< 0.10	< 0.09	< 0.10
Dieldrin	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Endosulfan I	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Endosulfan II	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Endrin	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Endrin ketone	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Heptachlor	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016
Methoxychlor	mg/kg dry wt	< 0.013	< 0.015	< 0.016	< 0.015	< 0.016



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

Sample Type: Soil						
Sample Name:	POH-SS06 13-May-2025	POH-SS07 13-May-2025	POH-SS08 13-May-2025	POH-SS09 13-May-2025	POH-SS10 13-May-2025	
Lab Number:	3888618.6	3888618.7	3888618.8	3888618.9	3888618.10	
Individual Tests						
Dry Matter	g/100g as rcvd	64	71	66	72	71
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	2	2	3	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	0.25	0.19	0.21	0.15	0.18
Total Recoverable Chromium	mg/kg dry wt	20	14	10	8	10
Total Recoverable Copper	mg/kg dry wt	8	6	6	4	6
Total Recoverable Lead	mg/kg dry wt	6.5	6.9	7.3	4.2	5.8
Total Recoverable Nickel	mg/kg dry wt	2	2	< 2	< 2	< 2
Total Recoverable Zinc	mg/kg dry wt	14	13	20	8	19
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
alpha-BHC	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
beta-BHC	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
delta-BHC	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
gamma-BHC (Lindane)	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
cis-Chlordane	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
trans-Chlordane	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
2,4'-DDD	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
4,4'-DDD	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
2,4'-DDE	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
4,4'-DDE	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
2,4'-DDT	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
4,4'-DDT	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Total DDT Isomers	mg/kg dry wt	< 0.10	< 0.09	< 0.09	< 0.08	< 0.09
Dieldrin	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Endosulfan I	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Endosulfan II	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Endosulfan sulphate	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Endrin	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Endrin aldehyde	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Endrin ketone	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Heptachlor	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Heptachlor epoxide	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Hexachlorobenzene	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014
Methoxychlor	mg/kg dry wt	< 0.016	< 0.014	< 0.015	< 0.014	< 0.014

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Heavy Metals, Screen Level*	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-10
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	1-10
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-10

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

Testing was completed between 15-May-2025 and 16-May-2025. For completion dates of individual analyses please contact the laboratory.

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

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



Ara Heron BSc (Tech)
Client Services Manager - Environmental



Quote No 135990
 Primary Contact Aaron Thorburn 312803
 Submitted By Aaron Thorburn 312803
 Client Name Haigh Workman Limited 217580
 Address PO Box 89, Kerikeri 0245

Phone 09 407 8327 Mobile 027 331 2728
 Email aaron@haighworkman.co.nz
 Charge To Haigh Workman Limited 217580
 Client Reference Pohuehue Rd
 Order No 25050

Results To Reports will be emailed to Primary Contact by default.
 Additional Reports will be sent as specified below.
 Email Primary Contact Email Submitter Email Client
 Email Other
 Other

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

ADDITIONAL INFORMATION / KNOWN HAZARDS

ANALYSIS REQUEST

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

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

Office use only
 (Job No)

CHAIN OF CUSTODY RECORD

Sent to Hill Labs Date & Time: 13.5.25 1400hrs

Name: A. Thorburn
 Tick if you require COC to be emailed back
 Signature: *[Signature]*

Received at Hill Labs Date & Time:

Name:
 Signature:

Condition Temp:
 Room Temp Chilled Frozen

Sample & Analysis details checked
 Signature:

Priority Low Normal High

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

NOTE: The estimated turnaround time for the types and number of samples and analyses specified on this quote is by 4:30 pm, 2 working days following the day of receipt of the samples at the laboratory.

Requested Reporting Date: Fri 16 May

Quoted Sample Types

Soil (Soil)

No.	Sample Name	Sample Date/Time	Sample Type	Tests Required
1	POH-SS01	13.5.25	Soil	DCLSC & HMs Soil (OCP & Heavy Metals, Screen)
2	POH-SS02	13.5.25	Soil	
3	POH-SS03	13.5.25	Soil	
4	POH-SS04	13.5.25	Soil	
5	POH-SS05	13.5.25	Soil	
6	POH-SS06	13.5.25	Soil	
7	POH-SS07	13.5.25	Soil	
8	POH-SS08	13.5.25	Soil	
9	POH-SS09	13.5.25	Soil	
10	POH-SS10	13.5.25	Soil	