



WILLIAMSON
WATER & LAND ADVISORY

Auckland Surf Park: Stage 2

Preliminary and Detailed Site Investigation (Ground Contamination)

AW HOLDINGS 2021 (LP) PARTNERSHIP

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Investigation Summary

Williamson Water & Land Advisory (WWLA) has prepared this preliminary and detailed site investigation (PSI/ DSI) into ground contamination to support Stage 2 of the Auckland Surf Park project in Dairy Flat. The objective of this investigation was to determine the potential for contamination, and if present consenting and construction implications. The key findings of this report are:

<p>History and potential for contamination [Section 3]</p>	<p>Potentially contaminating activities (those listed on the Ministry for the Environment’s Hazardous Activities and Industries List, or HAIL) were identified at the desk study phase.</p> <ul style="list-style-type: none"> The site has always been in rural or rural residential use. Construction of houses and sheds commenced from the late 1970s. Some of the buildings have included potential asbestos-containing materials (ACM) and drenches are likely to have been used in sheep yards. Fill may also have been placed. HAIL activities were identified for the site: <ul style="list-style-type: none"> Use of animal drenches (Activity A8; 1320 Dairy Flat Highway and 105 Lascelles Drive). Use of asbestos building materials (Activity E1; 1320 Dairy Flat Highway) Placement of fill (Activity I; 105 Lascelles Drive) No potential HAIL activities were identified for 89 Lascelles Drive.
<p>Field observations, laboratory results and discussion [Section 4]</p>	<p>Laboratory testing confirms elevated concentrations of metals in topsoil in two areas at 1320 Dairy Flat highway, with isolated arsenic presenting a human health risk. No contamination was present at the Lascelles Drive land parcels.</p> <ul style="list-style-type: none"> Soil sampling was undertaken around the buildings/ structures and potentially filled areas identified as possible HAIL areas on 1320 Dairy Flat Highway and 105 Lascelles Drive. Soil sampling for general soils handling was also undertaken at 89 Lascelles Drive. Testing confirms soils across the majority of the site are within expected background ranges for the contaminants tested, and no asbestos was identified in soil. Arsenic in topsoil within stockyards and around the residential dwelling at 1320 Dairy Flat Highway exceeded NESCS high-density residential criteria, likely sourced from use of treated timber. There were no exceedances of environmental discharge criteria on any of the three properties.
<p>Conceptual site model (CSM) [Section 5]</p>	<p>The CSM illustrates the risks posed to people and the environment from contaminants in soil during and following site redevelopment. Contaminants are present at 1320 Dairy Flat Highway that pose a potential risk to human health. Offsite disposal of surplus soils, if any, also requires management.</p> <ul style="list-style-type: none"> There is no risk to workers on site during earthworks and construction or future commercial site occupants. Potential risk to future residential occupants needs to be managed and remediated. Standard earthworks controls will be sufficient to mitigate effects on the environment during remediation, but if taken offsite contaminated soil must be disposed appropriately to prevent effects at the disposal site.
<p>Consenting implications [Section 6.2]</p>	<p>Consent is required under the NESCS as a restricted discretionary activity for the 1320 Dairy Flat Highway land parcel but not for the Lascelle Drive properties. Contaminated land-related rules in the AUP do not apply to any land parcel.</p> <ul style="list-style-type: none"> The National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations (NESCS) apply to 1320 Dairy Flat Highway because HAIL activities have occurred onsite. Consent is required as a restricted discretionary activity for soil disturbance, subdivision and land use change. The rules in the Auckland Unitary Plan – Operative in Part do not apply to any land parcel as all contaminants are below the permitted activity discharge criteria set out in Section E30, Table E30.6.1.4.1.
<p>Earthworks implications [Section 6.3]</p>	<p>A site management plan for ground contamination (SMP) has been prepared and is appended (Appendix B) for earthworks to remediate arsenic impacted soils at 1320 Dairy Flat Highway. No remediation is required at the Lascelles Drive properties. For 1320 Dairy Flat Highway:</p> <ul style="list-style-type: none"> An asbestos survey of the dwelling must be carried out prior to demolition and any ACM removed in accordance with the Health and Safety at Work (Asbestos) Regulations 2016. A range of remediation options are available for the arsenic impacted topsoil, including retention/reuse on site. Standard earthworks controls apply to the site with a particular focus on minimising discharges from remediation activities. Aside from the two areas of contamination, topsoil and natural subsoils are assessed as meeting cleanfill criteria (i.e. published background).

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Appendix A – Laboratory Transcripts

Appendix B –Site Management Plan (Ground Contamination)

1. Introduction

Williamson Water & Land Advisory Ltd (WWLA) has prepared this ground contamination investigation report, comprising a Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI), to support AW Holdings 2021 (LP) Partnership’s development of a Surf Park and associated infrastructure at Dairy Flat, Auckland. This report specifically refers to additional land parcels to be incorporated into the project as part of Stage 2 works; 1320 Dairy Flat Highway, and 89 and 105 Lascelles Drive, Dairy Flat (referred to as ‘the site’). These properties are north and south of the Stage 1 portion of the project. The properties covered by this report are described in Table 1 with the location shown in Figure 1.

Table 1. Site identification details

Address	Legal description	Title	Area (ha)
1320 Dairy Flat Highway	Lot 4 DP 66181	NA42A/198	4.4212
89 Lascelles Drive	Lot 1 DP 151504	NA42A/198	2.0820
105 Lascelles Drive	Lot 2 DP 151504	NA90B/284	4.9840

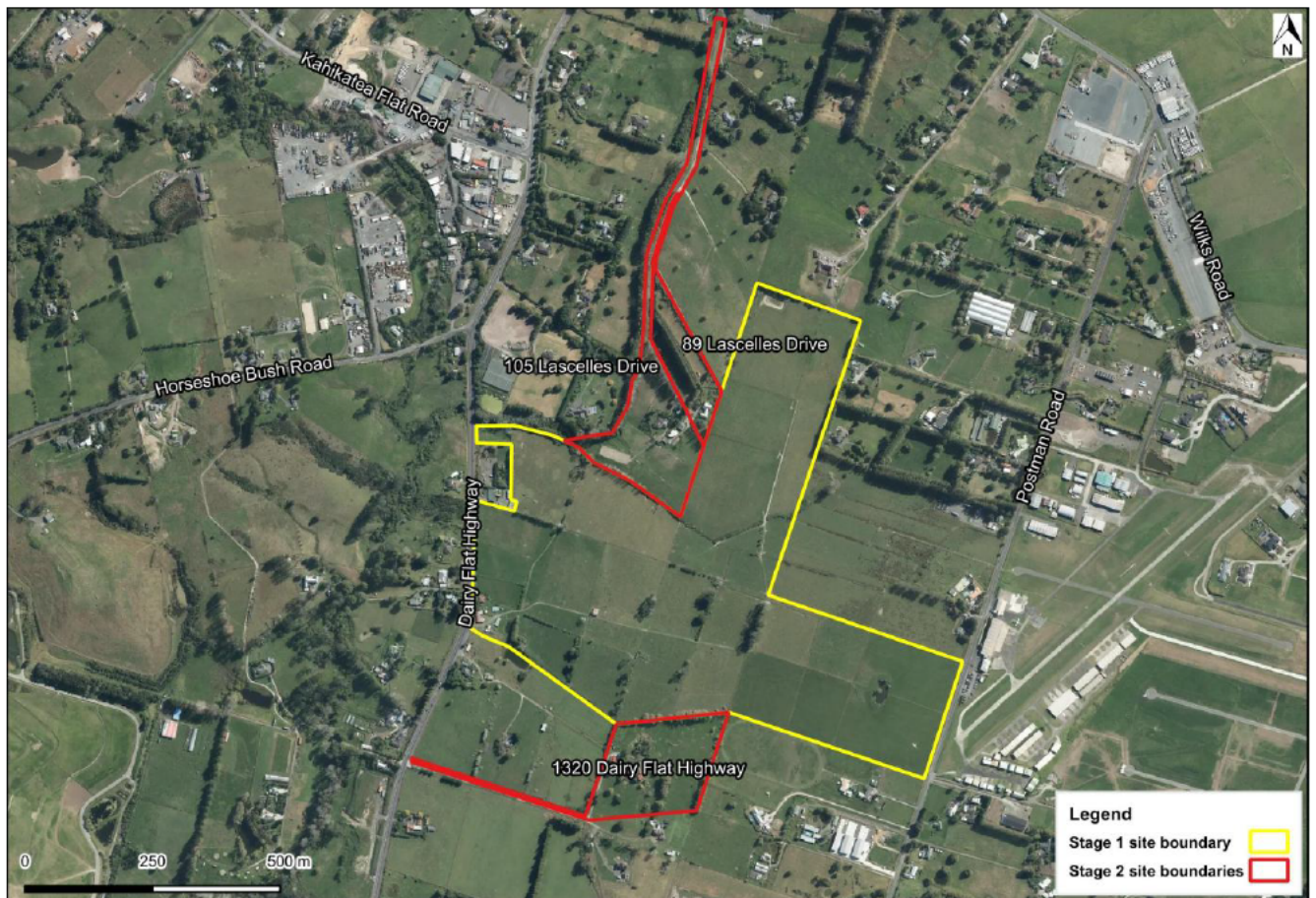


Figure 1. Site location, outlined in red with stage one area in yellow (image source: Land Information New Zealand (LINZ), 2024-2025).

1.1 Background

Stage 1 of the Surf Park project is underway and a Stage 2 expansion is being considered, which will include three (3) additional properties (as described above and referred to as the site). The expansion area, outside of the surf park will include a hyperscale artificial intelligence data centre campus, three residential

neighbourhoods, village centre, live/work and light industrial precincts, solar farm extension, and associated civil, infrastructure and landscaping works. Specifically for these three properties, the proposed land uses are:

- 1320 Dairy Flat Highway: live-work precinct in the western half (townhouses with commercial units attached) and a solar farm in the eastern half.
- 89 & 105 Lascelles Drive: neighbourhood precinct comprising single-lot residential properties, some parks and landscaping.

There is potential for contaminating activities (i.e. those included on the Environment's (MfE) Hazardous Activities and Industries List (HAIL)) to have occurred on the site. If HAIL activities are confirmed, the resource consent application to develop the site will need to consider the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) and rules in Section E30 of the Auckland Unitary Plan – Operative in Part (AUP).

1.2 Objective and scope of work

This investigation has been undertaken to confirm the site's history and the contamination status of soils to inform ground contamination-related consenting requirements, and to ascertain the associated implications for earthworks and future commercial and residential use. The scope of this investigation comprised:

1. Review of the site's history including:
 - Historical aerial photographs sourced from Retrolens, Auckland Council GeoMaps, Google Earth; and
 - Auckland Council property file.
2. Site walkover inspection by a Suitably Qualified and Experienced Practitioner (SQEP).
3. Assessment of the potential for contamination, based on current and historical land use and evaluation of that against the HAIL.
4. Collection of soil samples to investigate impacts of any potential HAIL activities identified.
5. Laboratory testing of samples for contaminants of concern as identified by the HAIL assessment.
6. Development of a conceptual site model (CSM) to assess contaminant risks and mitigation requirements during the works and post-construction.
7. Evaluation of consenting requirements and earthworks/construction implications for redevelopment of the site for commercial, single-lot and high-density residential purposes.

1.3 Legislative requirements

WWLA has undertaken this investigation and prepared this report in general accordance with requirements of published industry best practice guidance, including:

- Ministry for the Environment (MfE) Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand (Revised 2021), (CLMG 1).
- MfE's Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2021), (CLMG 5).
- New Zealand Guidelines for Assessing and Managing Asbestos in Soil (NZAG; BRANZ, November 2017).

This report has been prepared, reviewed, and certified by WWLA's SQEPs as described in the NESCS Users' Guide¹. CVs confirming the SQEP status of our contaminated land specialists are available on request.

¹ Ministry for the Environment, April 2012. Users' guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

2. Environmental Setting

The environmental setting is described in **Table 2**. The features of the environmental setting are considered in the context of their potential to affect the distribution, mobility and form of contaminants (if present).

Table 2: Environmental setting.

<p>Topography and drainage</p>	<p><i>The topographical nature of the site impacts where contaminants might migrate to if present and surface water features are potential receiving environments should contaminants be present on a site.</i></p> <p>1320 Dairy Flat Highway: This property is relatively flat, with a slight slope down toward the west from an elevation of 60 m on the eastern boundary to ~58 m on the western boundary. There are no watercourses on site, but overland flow paths are modelled near the northern and western boundaries, flowing west.</p> <p>89 and 105 Lascelles Drive: These properties are also relatively flat, with a slight slope down from the northeast (64 mRL) to the southwest (50 mRL). 85 Lascelles Drive sits higher than 105 Lascelles Drive. Earthworks have occurred at the southwest corner of 105 Lascelles Drive to create a flat area for a horse arena. An unnamed stream runs along the western boundary of 105 Lascelles Drive, joining another unnamed tributary which forms the property's southern boundary and eventually discharges to the Rangitopuni Stream. Small overland flow paths are modelled as draining into these tributaries from both properties.</p>
<p>Surrounding land uses</p>	<p><i>The nature of surrounding land uses affects both how the site might be impacted by activities in its surrounds (e.g. be contaminated by adjacent land uses), and how contaminants present at the site (if any) might impact on surrounding land uses.</i></p> <p>The surrounding area is predominantly rural residential. There is a small commercial area approximately 350 m northwest of the Lascelles Drive properties. Stage one earthworks for the Surf Park development are occurring between 1320 Dairy Flat Highway and 89 / 105 Lascelles Drive.</p>
<p>Geology</p>	<p><i>Geological conditions are considered in the context of describing the conceptual site model (CSM) (Section 5) should a potential for contamination be identified by this study. For example, more porous soils can enable contaminants to move more quickly and potentially further than clay-rich soils that retain/bind or prevent penetration of contaminants.</i></p> <p>The published geology² describes the site to be underlain by alluvial materials, deposits of the Tauranga Group above Mahurangi Limestone. Tauranga Group soils comprise a highly variable mixture of silts, clays and peat with fine sandy materials also present. Mahurangi Limestone typically comprises muddy limestone locally with glauconitic sandstone beds. Stage 1 geotechnical investigations³ confirmed the published geology.</p>
<p>Hydrogeology</p>	<p><i>Hydrogeological conditions affect the potential risk of a contaminant entering and being transported in groundwater.</i></p> <p>Data collected to date from monitoring wells, installed during Stage 1 geotechnical investigations (Initia, 2023), shows groundwater levels of between approximately 0.5 and 1.5 m below ground level (BGL). However, the rate of inflow into shallow test pits and hand augers was highly variable with some locations remaining dry during drilling.</p>
<p>Surface water bodies</p>	<p><i>Surface water features are potential receiving environments should contaminants be present on a site.</i></p> <p>An unnamed tributary of the Rangitopuni Stream forms the southern boundary of 105 Lascelles Drive. This flows to the west, being piped beneath Dairy Flat Highway, before intersecting the main channel of the Rangitopuni Stream some 200 m away. The Rangitopuni Stream drains a large portion of the catchments of the Dairy Flat and Riverhead areas, eventually discharging to the upper Waitemata Harbour at Riverhead, some 10 km to the south.</p>
<p>Sensitive receptors</p>	<p><i>Sensitive environmental receptors could include aquatic or terrestrial ecosystems. This is not an ecological assessment but is instead an initial review of the surrounding environment to assess where contaminants (if present) on the site could migrate to and whether the receiving ecosystem could be vulnerable to contaminants.</i></p> <p>The unnamed tributary of the Rangitopuni Stream and its associated ecosystem are the closest ecological receptors to the site.</p>

² Kermode, L.O. 1992. Geology of the Auckland Urban Area. Scale 1:50,000. Institute of Geological and Nuclear Sciences geological map 2. 1 Sheet 1 + 63 p. Institute of Geological and Nuclear Sciences Ltd., Lower Hutt, New Zealand.

³ Initia Geotechnical, May 2023. Auckland Surf Park Community, Geotechnical Factual Report. Prepared for AW Holdings 2021. Initia Ref P-001537, Rev 1

3. HAIL Assessment

This section details a HAIL Assessment, incorporating a walkover assessment to establish current site activities and a review of historical activities to determine whether activities listed on MfE’s HAIL have occurred. The findings of the HAIL review inform the requirement and scope for detailed investigations (sampling) if required and the planning assessment.

3.1 Site walkover

The site was visited by a SQEP from WWLA on 14 July 2025. The layout of the site and notable features are shown below on **Figures 3-5** and **Photographs 1 – 16**. The site encompasses three separate residential properties; 1320 Dairy Flat Highway (southernmost), 105 Lascelles Drive (northwestern-most) and 89 Lascelles Drive (northeastern-most).

<p>1320 Dairy Flat Highway</p>	<p>This property is a lifestyle block with the following features:</p> <ul style="list-style-type: none"> • The majority of the property is paddocks and isolated trees and a small pond on the eastern boundary (Photograph 1). • Structures are clustered near the western boundary, with a driveway leading from the west to a minor dwelling, then tennis court and main residence, all on the southern side of the driveway. To the north of the driveway is a metal shed, former yards, vegetable garden (within the yards) and swimming pool with associated pump house. • The main residence is constructed of timber (board and batten) with a tiled roof and potential asbestos-containing soffits (Photograph 2). • The minor dwelling is also board and batten construction, with a tiled roof (Photograph 3). • The tennis court is concrete and both the tennis court and swimming pool appear to be no longer maintained. • The shed is constructed from metal, it was locked and could not be inspected internally but is similar to a large garden shed. Adjacent to the east are small stockyards that are typical of lifestyle blocks, including a small race. The northern part of the stockyards is now being used for a vegetable garden (Photograph 4). • Northeast of the shed are water tanks.
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Photograph 1. General paddocks, looking north towards the Stage 1 earthworks



Photograph 2. General house view



Photograph 3. Minor dwelling



Photograph 4. Stockyards, looking towards vegetable garden. Metal shed to the left.



Figure 3. 1320 Dairy Flat Highway, site features and layout (source: LINZ, 2024-2025)

<p>89 Lascelles Drive</p>	<p>This property is a lifestyle block with the following features:</p> <ul style="list-style-type: none"> • A modern main residence is located in the south of the property along with associated small sheds, a garage and domestic glasshouse and vegetable garden. <ul style="list-style-type: none"> - The main residence is constructed of timber, and concrete/ plaster cladding with a corrugated metal roof (Photograph 5). - The garage has corrugated metal cladding and roofing with timber framing (Photograph 6). - The sheds are constructed of timber, corrugated metal and plywood cladding, and corrugated metal roofing (Photograph 6). • To the north of the main residence complex is a tractor shed constructed of timber framing with corrugated metal cladding and roofing. The floor comprises gravel with a plastic mud-grid. The shed currently stores a tractor/ mower, firewood and various property maintenance items (Photograph 7). • Further north again is a minor dwelling constructed of timber framing and cladding with a corrugated metal and corrugated clear plastic roof (Photograph 8). • The remainder of the site is predominantly paddocks and landscaping. There is a small, rectangular old farm shed, constructed from timber and corrugated metal roofing and cladding, located in the northwestern corner of the site near the driveway.
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Photograph 5. View of the main residence showing typical construction materials, facing southeast.



Photograph 6. View of the garage (right), garden sheds (middle) and vegetable garden (left), facing south.



Photograph 7. Tractor/ mower shed



Photograph 8. Minor dwelling located north of main residence.



Figure 4. 89 Lascelles Drive, site features and layout (source: LINZ, 2024-2025)

<p>105 Lascelles Drive</p>	<p>This property is an equestrian lifestyle block with the following features:</p> <ul style="list-style-type: none"> • A modern main residence is located in the central and eastern of the property along with a garage, minor dwelling, and sheds. <ul style="list-style-type: none"> - The main residence is constructed of brick and hardboard cladding with a tile roof and timber deck (Photograph 9). - The garage is also constructed from brick and hardboard cladding with a tile roof (Photograph 10). - To the northeast of the main residence is a minor dwelling constructed with weatherboard cladding, a corrugated metal roof and a timber deck (Photograph 11). - On the immediate southeastern side of the minor dwelling is a hay shed constructed from metal framing with corrugated plastic cladding and corrugated metal roofing (Photograph 11). - Another larger farm shed is constructed of corrugated metal cladding and roofing with metal roller doors (Photograph 12). • South and northwest of the main residence and sheds complex are the equestrian facilities: <ul style="list-style-type: none"> - To the southeast of the main residence is a block of covered horse yards constructed from corrugated plastic and metal roofing (Photograph 13). - Southwest of the covered yards is a barn/ stable block constructed from timber with corrugated metal cladding and roofing, with a concreted outdoor space on the eastern side for washing horses (Photograph 14). - To the immediate south of the barn/stables are old wooden stockyards (likely for sheep) (Photograph 15). - To the east of the stables and the covered yards are two large outdoor wooden yards (also for the horses). - The remainder of the site is paddocks surrounding the complex of buildings to the southeast, south, west and northwest, with a sand horse arena located near the southwestern corner (Photograph 16). The area around the arena appears to have been earthworked to create a flat platform.
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Photograph 9. View of the main residence, facing northeast.



Photograph 10. View of the garage, facing south.



Photograph 11. View of the minor dwelling (left) and hay shed (right), facing east.



Photograph 12. View of the shed, facing southwest.



Photograph 13. View of the covered yards, facing northeast.



Photograph 14. View of the barn and stables (green building) and the horse washbay (concrete pad to left of image), facing southwest.



Photograph 15. Old wooden stockyards behind barn/stables.



Photograph 16. View of the sand horse arena, facing west.



Figure 5. 105 Lascelles Drive, site features and layout (source: LINZ, 2024-2025)

3.2 Site history review

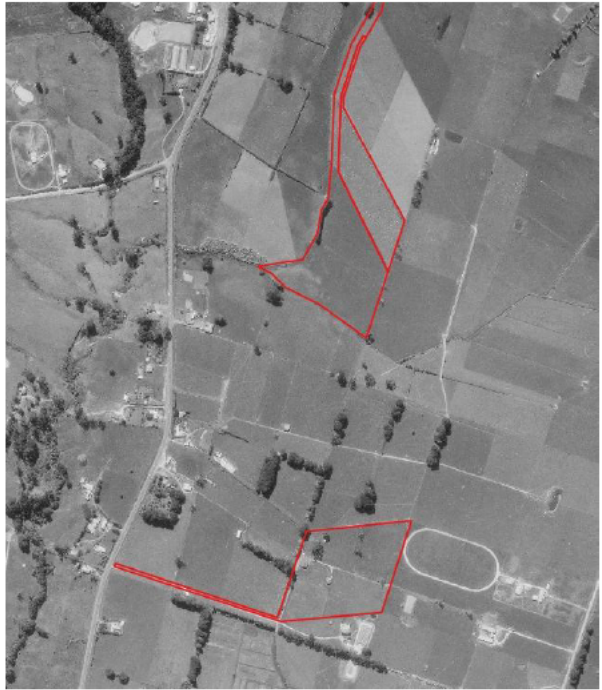
Information used to determine the site’s history is described in the subsequent subsections. Our interpretation of the site history from the available information is as follows:

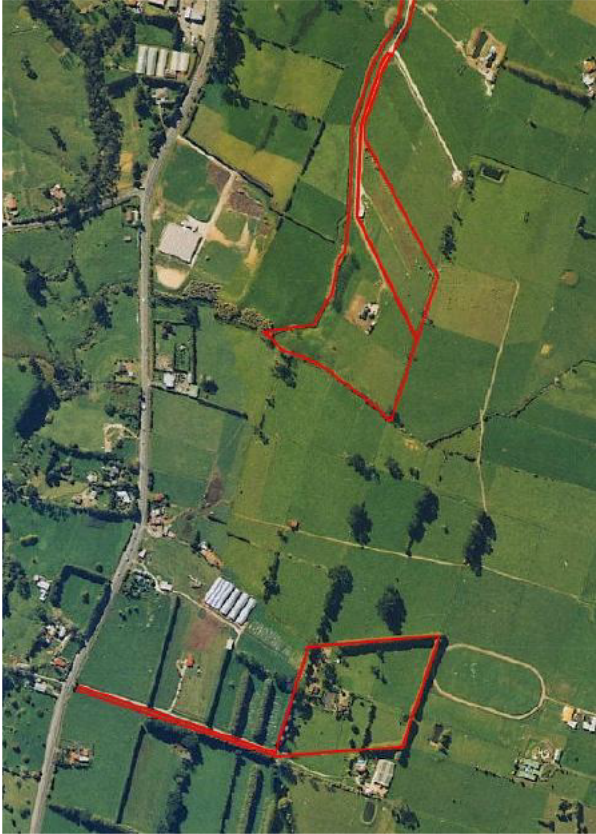
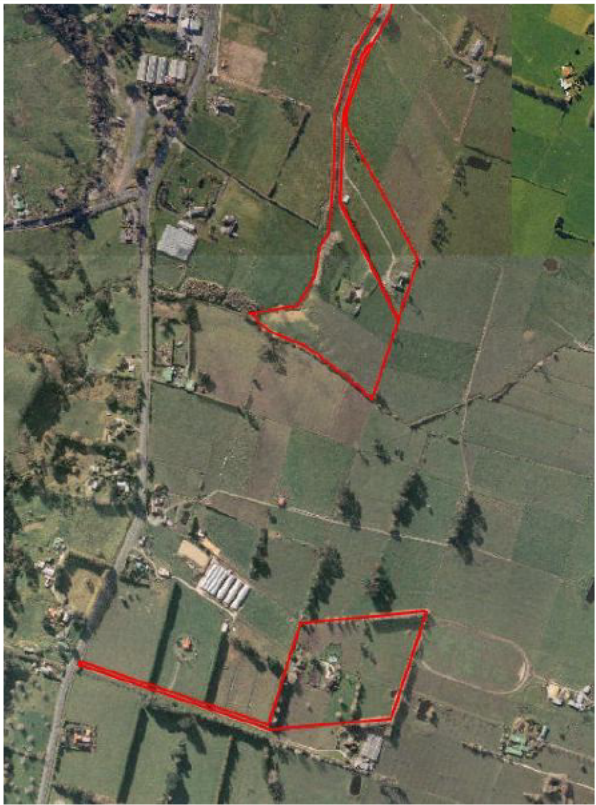
From at least 1940 to 1981 the site comprised vacant farmland. By 1981 the property at 1320 Dairy Flat Highway had been redeveloped into a lifestyle residence with main and minor dwellings constructed. By 1996, 89 and 105 Lascelles Drive had begun to be developed, also into lifestyle properties. All three properties have been modestly redeveloped over the decades, with small sheds and garages and the establishment of the equestrian facilities at 105 Lascelles Drive being the most significant changes. Land immediately surrounding the site has always been predominantly in rural or rural residential use.



3.2.1 Historical aerial imagery review

Historical aerial imagery from Retrolens.nz and Auckland Council GeoMaps have been reviewed. A summary of the key observations is described below.

Table 3. Historical aerial photograph review.

Photograph date (source):	Description:	Aerial image (approximate site in red outline):
1940-1981 Retrolens (images viewed: 1940: SN143 86/29; 1957: SN1052 D/4; 1961: SN1370 D/6; 1975: SN3800 G/7; 1981: SN5783A H/15) [1981 image shown]	<p>From the earliest aerial photograph available until at least 1975, the site comprises pasture with no structures.</p> <p>By 1981, two buildings had been constructed near the centre and western boundary of 1320 Dairy Flat Highway (southern property); the minor and main dwellings. A small square structure (possibly an animal shelter) is present near the northwestern corner of the property.</p> <p>The two northern properties remain in pasture, vacant of any buildings.</p> <p>The surrounding land primarily comprises farmland and rural residences, with occasional commercial properties (predominantly horticultural).</p>	

Photograph date (source):	Description:	Aerial image (approximate site in red outline):
<p>1988-1996 Auckland Council Geomaps and Retrolens (images viewed: Retrolens 1988: SN8772 D/13, and Auckland Council Geomaps, 1996)</p> <p><i>[1996 image shown]</i></p>	<p>By 1988, an oval-shaped pond had been constructed near the middle of the eastern boundary of 1320 Dairy Flat Highway, and the property was bordered to the north, west and south by hedgerows/shelterbelts.</p> <p>By 1996, a small farmshed was observed in the northwestern portion of 89 Lascelles Drive (northern-most property).</p> <p>Also by 1996, the main dwelling and separate garage at 105 Lascelles Drive (central property) had been constructed; and a small, long rectangular building and two water tanks had also been established southeast of the main dwelling and garage.</p> <p>Further development of the surrounding area for horticultural activities (construction of glasshouses) is observed, including a slight increase in market gardening in the immediate surrounds of the southern-most property.</p>	
<p>2001 Auckland Council Geomaps</p>	<p>By 2001, main dwelling at 89 Lascelles Drive had been constructed and a vegetable garden had been established in the southern corner of the property. No apparent changes to 105 Lascelles Drive were observed.</p> <p>At 1320 Dairy Flat Highway, establishment of a tennis court between the minor and main dwellings, construction of a swimming pool to the north of the main dwelling and stockyards along the western boundary north of the minor dwelling all occurred between the 1996 and 2001 aerial photographs.</p> <p>The surrounding land appears largely unchanged.</p>	

Photograph date (source):	Description:	Aerial image (approximate site in red outline):
<p>2010-17 Auckland Council Geomaps (Images viewed: 2010-2011 and 2017) [2017 image shown]</p>	<p>At 89 Lascelles Drive, a large garage shed and two smaller garden sheds were constructed to the southwest of the main dwelling between 2010-11 and 2017.</p> <p>Several buildings including the minor dwelling, shed, covered stables and stockyards were constructed at 105 Lascelles Drive between the 2001 and 2010-11 aerial photographs. The covered stable block replaced the previously existing small, long rectangular building and two water tanks that formerly occupied the location. By 2017, the arena was under construction.</p> <p>At 1320 Dairy Flat Highway, removal of the small square structure near the northwestern corner occurred by 2010-11 and two water tanks were added along the western boundary by 2017.</p> <p>The surrounding land continues to slowly undergo residential densification and commercial redevelopment; however, the predominant land use remains farmland and rural residences.</p>	
<p>2024-25 Auckland Council Geomaps</p>	<p>By 2024, a minor dwelling has been added further north of the main dwelling at 89 Lascelles Drive, and a small square garden shed has been added along the eastern boundary. A tractor/mower shed has been constructed northwest of the main dwelling.</p> <p>At 105 Lascelles Drive, construction of the sand arena was complete. A block of covered yards and two larger outdoor yards (for horses) had also been established to the north and east of the covered stable block, respectively.</p> <p>By the 2024-25 aerial photograph, a small square wooden deck had been constructed to the immediate west of the swimming pool at 1320 Dairy Flat Highway, and a small rectangular shed had been added to the southwestern side of the stockyards.</p> <p>The surrounding land continues to undergo redevelopment to residential and commercial/industrial properties, particularly further northwest and east of the site.</p>	

3.2.2 Auckland Council property file

The property files were provided by AW Holdings 2021 (LP) Partnership in September 2025. The files were reviewed by a WWLA SQEP, and relevant documents are summarised in **Table 4**.

Table 4: Auckland Council property file documents

Date:	Relevant information:
1320 Dairy Flat Highway	
1976	The original application to construct a dwelling at the property. Fibrolite soffits and roofing are specified on plans, which due to the age may contain asbestos. Also in 1976 was an application to construct a barn and stables. No asbestos building products are specified on barn/ stables plans.
1983	Plans show an extension to an existing dwelling. No fibrolite/ asbestos products are specified.
1997	Plans show an existing house and tennis court with a new pool proposed.
2009	Multiple documents relating to a subdivision application. These do not have any impact on potential for contamination on the property .
2013	Application to construct a minor dwelling. Other plans indicate that the 1976 barn/ stables were to be converted into the minor dwelling.
89 Lascelles Drive	
1997	Building consent application to construct a dwelling at the property. No asbestos-containing materials specified.
2014	Building consent application for a new barn/ implement shed, to be located west of the existing dwelling.
105 Lascelles Drive	
1992	Resource consent application for a subdivision. This appears to be related to the creation of 89 and 105 Lascelles Drive off another property.
1997	Building consent application to construct a new dwelling.
2003	Building consent application to relocate a minor dwelling. It is not clear if this was already on the property.
2004	Building consent application to construct a garage/ outbuilding.

3.3 Potential for contamination

Potentially contaminating activities as determined by the site history review and walkover are described in **Table 5**, along with an assessment of the likelihood and magnitude of any contamination resulting from the activity, and whether the activity constitutes a HAIL. The assessment has been shaded **red** where a HAIL is confirmed, **orange** where the activity may be considered a HAIL depending on the findings of soil testing.

We note that garages, glasshouses, tractor storage and garden sheds have not been considered as HAIL activities due to their domestic nature.

We note that no confirmed or potential HAIL activities have been identified for 89 Lascelles Drive but are present in localised areas on 1320 Dairy Flat Highway and 105 Lascelles Drive.

Table 5: Evaluation of potentially contaminating activities from previous and current land use.

Land use and associated HAIL activity	Potential contaminants	Possible extent of contamination	HAIL Assessment
Animal yards/ spray races/ drench use <i>Activity A8: Livestock dip or spray race operations</i>	Organochlorine pesticides (OCPs), arsenic, copper	Small stockyards/ spray races were observed on two land (1320 Dairy Flat Highway and 105 Lascelles Drive) parcels and may have localised elevated levels of contaminants. If present, these are most likely to be confined to surface soils in the immediate vicinity of the yards.	HAIL Activity A8 applies to 1320 Dairy Flat Highway and 105 Lascelles Drive.

Land use and associated HAIL activity	Potential contaminants	Possible extent of contamination	HAIL Assessment
		OCPs were largely phased out by the period in which these products would have been used (post-1980s) but are included as they were still occasionally in use.	
Use of asbestos-containing materials (ACM) on buildings. <i>Activity E1: Sites with buildings containing asbestos products known to be in a deteriorated condition.</i>	Asbestos	The dwelling at 1320 Dairy Flat Highway was constructed using asbestos containing materials (ACM). This was confirmed with the site walkover. ACM-containing inground infrastructure such as water pipes and building formwork/ shuttering may also be present. Maintenance or natural degradation of ACM may result in asbestos fibres being released into soil. Soil testing is required to determine if asbestos is present.	HAIL Activities E1 may apply to 1320 Dairy Flat Highway this will be confirmed through testing.
Fill placement near horse arena <i>Potentially Activity I: Intentional or accidental release of a contaminant in sufficient quantity to present a risk to human health or the environment.</i>	Wide ranging depending on source but typically metals and polycyclic aromatic hydrocarbons (PAHs). Asbestos if fill includes demolition debris	Fill has been placed at 105 Lascelles Drive to create a horse arena. This may have been cut-to-fill (i.e. site-won material) but testing will confirm that no contamination has been imported from offsite.	HAIL Activity I may apply to 105 Lascelles Drive this will be confirmed through testing.

4. Soil Characterisation

Soil sampling was undertaken on 14 July 2025 by a SQEP from WWLA. The following provides the rationale, method and results of soil sampling and testing.

4.1 Sampling and analysis rationale

Sample locations were targeted to investigate confirmed and potential HAIL activities discussed in **Section 3.3**. The sampling strategy is provided in **Table 6** and sampling locations are shown in **Figure 6** (1320 Dairy Flat Highway) and **Figure 7** (Lascelles Drive land parcels).

Table 6. Sampling strategy and rationale

HAIL Activity/ purpose of sampling	Potential contaminants	Sampling rationale	Sample locations (refer Figure 6/ Figure 7)
Usage of pesticides in livestock spray races/ yards	OCPs, arsenic, copper	<ul style="list-style-type: none"> Potential pesticide uses for animals post-1980s. Testing of surface soils (0.0-0.1 m) in yard and spray race areas. Testing for metals and OCPs. Testing of a deeper soil sample (0.3 m) to vertically delineate potential contamination at HA3. Testing as above. 	<i>1320 Dairy Flat Hwy:</i> HA3-HA5 <i>105 Lascelles Dr:</i> HA9
Asbestos use on buildings	Asbestos	<ul style="list-style-type: none"> Surface soils (0.0-0.1 m), around the dwelling at 1320 where ACM use was identified. This sample was representative of topsoil alongside the dwelling, where it was unpaved, as per Figure 4. 	<i>1320 Dairy Flat Hwy:</i> S1
Placement of fill	Metals, PAHs	<ul style="list-style-type: none"> Samples of fill at 0.5 and 1.0 m bgl Testing for metals and PAHs. No demolition debris was observed so asbestos was not tested for. 	<i>105 Lascelles Dr:</i> HA8
To inform offsite disposal implications	Metals (as above), OCP, asbestos	<ul style="list-style-type: none"> Determine potential contaminant concentrations to inform offsite disposal options for surplus soils excavated during redevelopment. 	All locations Topsoil (0.0 – 0.1 m) Subsoil (0.2 – 1.0 m)

4.2 Sampling methodology

The sampling procedure was as follows:

- Soil sampling was in general accordance with MfE's CLMG 5. This involved:
 - Collection of samples from the trowel/hand auger using gloved hands, placed directly into laboratory-prepared glass jars for metals and OCPs testing.
 - Use of strengthened zip-lock bags for presence/absence assessment and semiquantitative analysis of asbestos in soils.
 - Changing gloves and decontamination of equipment (trowel and auger) between sample locations using phosphate-free detergent and freshwater rinses.
 - Courier of samples to the laboratories, chilled, under chain of custody documentation.
- Asbestos and chemical samples were sent to IANZ-accredited Eurofins Focus Laboratories (Auckland) and Analytica Laboratories (Hamilton) respectively.



Figure 6. Sampling locations at 1320 Dairy Flat Highway (source: LINZ 2024-2025).

4.3 Field observations

The following observations were made by the WWLA SQEP during the investigations:

- Topsoil comprising moist, medium brown silt with organics, generally extending to 0.2-0.3 mBGL.
- Natural ground was encountered beneath the topsoil in almost all locations, comprising a weathered light grey brown to yellowish brown silty clay.
- The exception was HA8 where material appeared to be reworked (still a silty clay), with iron staining and brown streaks. This was relatively consistent through to 1.0 m bgl, the target depth for this location.

No visual or olfactory evidence of contamination, and no fill aside from the reworked natural soils, was observed.

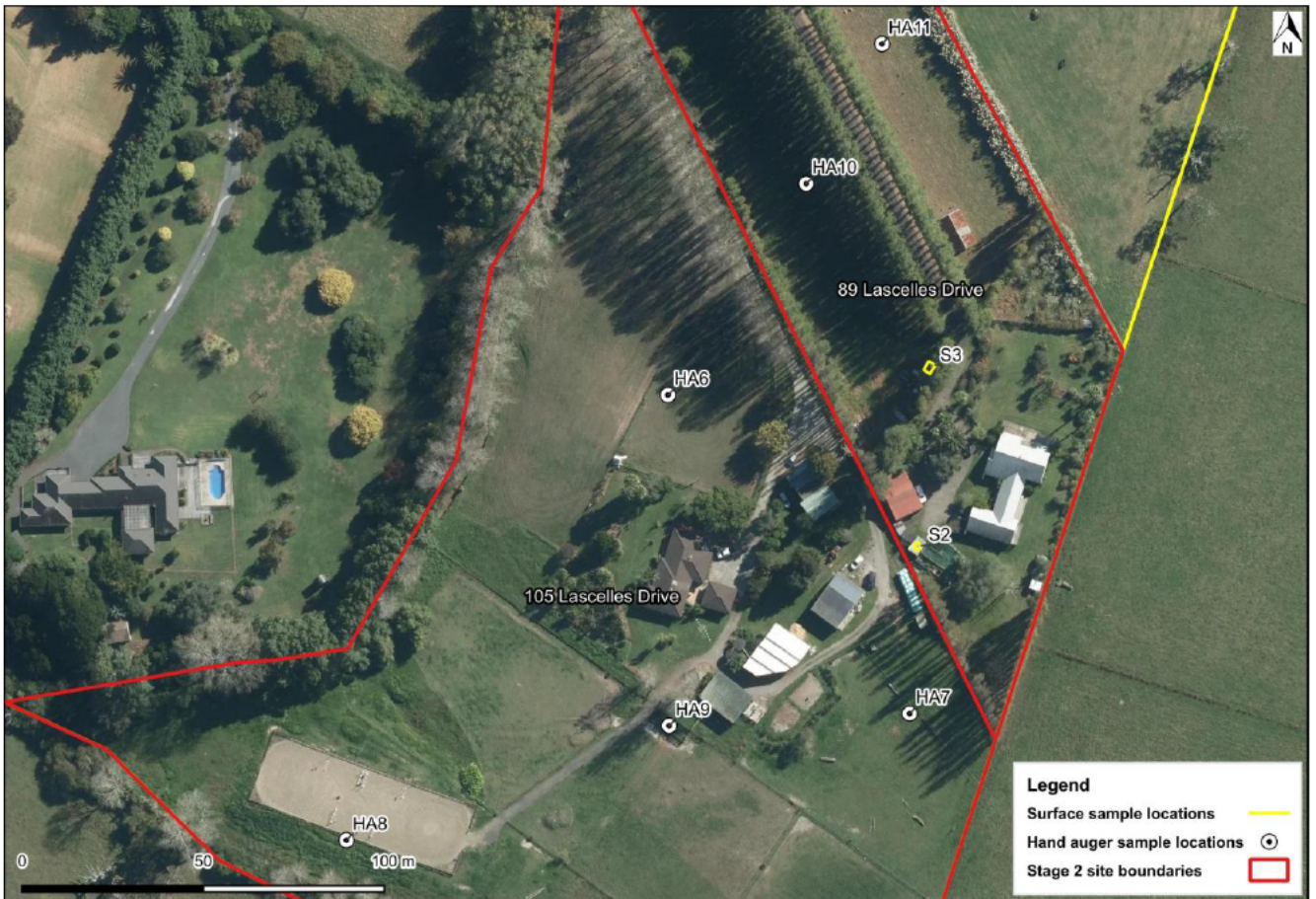


Figure 7. Sampling locations at 89 and 105 Lascelles Drive (source: LINZ 2024-2025).

4.4 Soil evaluation criteria

The laboratory testing results were compared to the evaluation criteria set out in **Table 7** and are discussed in **Table 8**.

Table 7. Soil evaluation criteria

Protection of Human Health	<ul style="list-style-type: none"> • NESCS contaminant standards as applicable to the proposed land uses, being for high-density residential land use and commercial/ industrial land use for 1320 Dairy Flat Highway, and standard residential (10% produce) for Lascelles Drive properties. • NESCS contaminant standards for commercial/industrial land use to assess effects on construction workers undertaking the redevelopment for all properties. • Where NESCS standards were not provided, guidance was obtained from MfE’s “Contaminated Land Management Guideline No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011)” including the [Australian] National Environment Protection (Assessment of Site Contamination) Measure 1999, updated 2013 for commercial (HIL D), residential (HIL A) and high-density residential (HIL B) as appropriate. • For asbestos: BRANZ, 2017. New Zealand Guidelines for Assessing and Managing Asbestos in Soil. The “all users” criteria selected to assess both effects on commercial users and future residents.
Discharges to the Environment	<ul style="list-style-type: none"> • The Auckland Unitary Plan (AUP) Permitted Activity Soil Acceptance Criteria, or where appropriate the criteria specified by Rule E30.6.1.4 of the AUP. Where contaminants are not listed in the table, the hierarchy listed in AUP Section E.30 has been adopted. • Note, asbestos is not assessed as part of the AUP.

Background/clean fill disposal criteria	<ul style="list-style-type: none"> Published non-volcanic background concentrations for Auckland described in TP153⁴ are applicable for this site given its setting. Background values are considered when assessing the activity status of the NESCS for soil disturbance and removal and used as a basis for acceptance of soil to clean fill sites.
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4.5 Laboratory results and discussion

Laboratory soil testing results are discussed in **Table 8** and set out in full in **Table 9** along with the assessment criteria in **Table 7**. Laboratory transcripts are attached in **Appendix A**.

In summary, slightly elevated concentrations of arsenic, copper and chromium are present in topsoil at 1320 Dairy Flat Highway. Arsenic concentrations are in exceedance of applicable NESCS high-density residential criteria in two locations but do not exceed commercial criteria (the intended uses of that property). There are no other exceedances of human health criteria and no exceedances of environmental criteria. No asbestos was detected.

Table 8. Discussion of laboratory testing results

1320 Dairy Flat Highway	<ul style="list-style-type: none"> No asbestos was detected. Arsenic, copper and/or chromium are elevated above background concentrations around the livestock yards and adjacent to the dwelling. Arsenic is most consistently elevated, with the other two metals being inconsistent. At S1 (the dwelling) and HA3 (0.1 m, the spray race), concentrations exceed high-density residential criteria (this part of the site is proposed for live-work units). Concentrations decrease notably by 0.3 m bgl in HA3. Given the signature of metals that are elevated, and that elevated results are present adjacent to the house as well as the livestock areas, this is more likely to be attributed to treated timber than livestock spray race/drench activities. No contamination was observed in paddocks (HA1 and HA2). There were no exceedances of environmental criteria, or human health criteria for commercial use.
89 Lascelles Drive	<ul style="list-style-type: none"> Metal concentrations are all below published background values for non-volcanic soils. The exception is slightly elevated zinc by one shed, although this is well within the range of volcanic soils and does not present a risk to human health or the environment (samples S3).
105 Lascelles Drive	<ul style="list-style-type: none"> Metal concentrations are below published background values for non-volcanic soils, and there were no detectable OCPs. Copper is slightly elevated near former yards but is so close to the background concentration that it could be considered within the margin of error and is well below the range expected of volcanic soils.

⁴ Auckland Regional Council, TP153 (TP153): Background concentrations of inorganic elements in soil from the Auckland Urban Region.

Table 9. Laboratory testing results summary

Sample information	Sample Location	NESCS commercial/ industrial/ outdoor worker ¹	NESCS high-density residential ¹	NESCS residential (10% produce) ¹	AUP permitted activity discharge criteria ²	Published background (non-volcanic) ³	1320 Dairy Flat Highway					89 Lascelles Drive			105 Lascelles Drive																										
							S1	HA 1	HA2	HA3		HA4	HA5	S2	S3	HA 10	HA6	HA7	HA8		HA9																				
							0 m	0.1 m	0.1 m	0.1 m	0.3 m	0.1 m	0.1 m	0 m	0 m	0.1 m	0.1 m	0.1 m	0.5 m	1.0 m	0.1 m																				
							14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025																				
Material type																																									
Asbestos	ACM (bonded) % w/w ⁵	0.05	0.04	0.01	-	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	AF+FA* %w/w ⁵	0.001	0.001	0.001	-	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Metals	Arsenic	70	45	20	100	12	69.1	3.5	5.6	54.4	16.1	24.7	13.9	5.4	7.3	1.4	1.8	1.2	1.2	0.84	8.9																				
	Cadmium	1,300	230	3	7.5	0.65	0.28	0.18	0.3	0.51	0.094	0.551	0.46	0.21	0.29	0.3	0.14	0.23	0.4	0.026	0.4																				
	Chromium	6,300	1,500	460	400	55	43.5	9.4	9.9	76.4	8.7	22.6	12	12.6	11	5.7	4.9	5.7	4.9	4.8	16.1																				
	Copper	>10,000	>10,000	>10,000	325	45	62.1	34.2	29.5	83.7	19.4	43.7	29	25	19.1	10.2	8.47	11.1	4.6	2.8	49.2																				
	Lead	3,300	500	210	250	65	26.9	16.4	15.3	15.6	12.5	22.8	15.7	9.54	15.2	5.99	6.39	6.12	7.21	6.1	5.65																				
	Nickel	6,000 ⁴	1,200 ⁴	400 ⁴	105	35	10.9	19.2	11.4	9.58	6.45	8.93	6.07	12.8	7.32	4.7	4.2	5.84	2.8	1.1	10.5																				
	Zinc	400,000 ⁴	60,000 ⁴	7,400 ⁴	400	180	139	30.7	27.3	137	21.4	69.8	63	87.3	231	18.1	12.7	16.3	16.5	4.6	114																				
OCPs	All tested	-	-	-	-	-	-	-	-	<LR	<LR	<LR	<LR	-	-	-	-	-	-	<LR																					
PAHs	All tested	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<LR	<LR																				

All values are presented in mg/kg except where noted (asbestos).

* FA = fibrous asbestos, AF = asbestos fines.

ND denotes no asbestos detected.

<LR indicates concentration below the laboratory limit of reporting.

Grey values are below expected background values, black values exceed background concentrations, bold values exceed the human health criteria applicable to that property

1. MfE, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated). Soil Contamination Standard - Commercial/industrial land use, standard residential (10% produce) and high-density residential use as appropriate

2. Auckland Unitary Plan permitted activity discharge criteria (Standard E30.6.14).

3. Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of Inorganic Elements in Soils from the Auckland Region.

4. National Environment Protection Council [Australia] - National Environment Protection Measure (Assessment of Site Contamination). Health Investigation Levels - Commercial/industrial land use (HIL D), residential (HIL A) and high density residential (HIL B) as appropriate

5. BRANZ, 2024. New Zealand Guidelines for Assessing and Managing Asbestos in Soil.

5. Conceptual Site Model

A conceptual site model (CSM) indicates known and potential sources of contamination at the site, receptors who could be affected by the contaminants, and the routes of exposure (pathways). Receptors may be people or the environment (flora and fauna). *The CSM in the context of this site sets out where there may be a risk to people (construction workers, neighbouring residents, and future residents and workers) and the environment during and following the site's redevelopment.*

As noted in **Section 4.5**, topsoil at 1320 Dairy Flat Highway contains elevated arsenic, copper and chromium, with arsenic exceeding the applicable human health soil contaminant standards in two locations. The CSM shows that these arsenic exceedances require management/ remediation. There are no other exceedances of human health or environmental criteria on the three land parcels.

Table 10. CSM for redevelopment of the site

Source	Receptor	Exposure pathway	Risk assessment
Elevated metals in topsoil at 1320 Dairy Flat Highway	Site workers and neighbouring site occupants during soil disturbance.	Inhalation, ingestion or skin contact.	No risk posed. Soil testing shows contaminants are not at concentrations that present a risk to human health for site workers.
	Future site occupants.		Requires management Concentrations of arsenic present a potential risk to future residents. Remediation of isolated exceedances is recommended prior to bulk earthworks. This will need to be supported by validation sampling to confirm that exceedances have been removed/ remediated. A site management plan will be required to support remediation.
	Ecological receptors at the nearest surface water bodies	Dust, sediment and surface water runoff to surface water bodies.	No risk posed. Soil testing shows contaminants are not at concentrations that present a risk to the environment.
	Ecological receptors at a receiving soil disposal site.	Leaching to groundwater or surface water runoff to surface water bodies.	Requires management. If surplus to site needs, soil being remediated for arsenic exceedances will require disposal to a managed fill facility consented to take the elevated contaminants present. Natural subsoils directly beneath the topsoil are not impacted and are suitable for disposal as cleanfill. Standard earthworks controls will be appropriate. A site management plan (SMP) for ground contamination has been prepared (Appendix B) and sets out procedures for undertaking the works and for disposing of surplus soils.
All other soils at all three land parcels	All human health and environmental receptors	All pathways	No risk posed. Soil testing shows contaminants are not at concentrations that present a risk to human health and soils are suitable for reuse from a contamination perspective. Surplus soils are also expected to be suitable for cleanfill disposal.

6. Development Implications

6.1 HAIL re-evaluation

Soil testing has shown that the following potential HAIL activities do not apply:

- Activity E1 for asbestos – no asbestos has been identified in soil at 1320 Dairy Flat Highway.
- Activity I for fill – no contaminants are present that present a risk to human health or the environment at 105 Lascelles Drive.
- Activity A8 related to livestock sprays - does not apply as elevated contaminants at 1320 Dairy Flat Highway are more likely to be attributed to leaching from treated timber rather than livestock dips/ drenching. No elevated contaminants were noted at the stockyards at 105 Lascelles Drive.

However, as concentrations of arsenic at 1320 Dairy Flat Highway present a risk to human health, **HAIL Activity I does apply to areas where timber structures are present (house and yards)**. Refer to **Figure 8** for the confirmed HAIL area.



Figure 8. Location and extent of HAIL Activity I on the site (source: LINZ 2024-2025).

6.2 Consenting

The summary of contamination related consents required is presented below and discussed in detail in the following sections.

Table 11. Consent summary

Regulatory framework	Rule	Consent required (Y/N and type)
NESCS	8(1). Removing or replacing fuel storage system	No – not applicable.
	8(2). Soil sampling	No – not applicable.
	10. Disturbing soil	Yes – Consent as a restricted discretionary activity is required because permitted activity provisions (8(3)) and controlled activity provisions (9(1)) cannot be met.
	10. Subdivision and land use change	Yes – Consent as a restricted discretionary activity is required because permitted activity provisions (8(4)) and controlled activity provisions (9(3)) cannot be met.
AUP	E30.6.1.2 Discharges of contaminants from soil disturbance activities	No – There are no exceedances of the permitted activity discharge criteria so E30 rules do not apply

6.2.1 NESCS

The NESCS sets out nationally consistent planning controls for assessing potential human health effects related to contaminants in soil. The regulations apply to specific development activities (namely soil disturbance, soil sampling, subdivision, land use change, and fuel system removal) carried out on land where an activity included on the HAIL has occurred. Our assessment against the NESCS shows:

- **The NESCS does not apply to 89 and 105 Lascelles Drive** as no HAIL activities have occurred on these properties.
- **The NESCS applies to 1320 Dairy Flat Highway** because HAIL Activity I has occurred and contamination exceeding the proposed land use standard is present.
 - Soil disturbance, land use change and subdivision will require consent as a **restricted discretionary activity** as the permitted activity and controlled activity provisions cannot be met (refer **Tables 10-13**).
 - The consent application will need to be supported by a Site Management Plan (prepared and provided in **Appendix B**).

Table 10. Evaluation of soil disturbance as a permitted activity under NESCS Rule 8(3) for 1320 Dairy Flat Highway

Rule 8(3)	Permitted activity provisions	Evaluation
(a)	Implementation of controls to minimise exposure of humans to mobilised contaminants.	Can be met (as per SMP in Appendix B).
(b)	The soil must be reinstated to an erosion free state within one month of completing the land disturbance.	Can be met.
(c)	The volume of the disturbance of the piece of land must be no more than 25 m ³ per 500 m ² . <i>[The HAIL area (piece of land) is approximately 770 m². Therefore, the permitted activity volume for disturbance is 38.5 m³.]</i>	Cannot be met. Removal of contaminated topsoil is expected to be around 160 m ³ insitu (top 200 mm of the HAIL areas shown in Figure 8), so soil disturbance in the piece of land will exceed the site-specific permitted activity volume of 38.5 m ³ .
(d)	Soil must not be taken away unless it is for laboratory testing or, for all other purposes combined, a maximum of 5 m ³ per 500 m ² of soil may be taken away per year. <i>[The site-specific permitted activity volume for soil removal is ~8 m³ per year. As a year is not defined in the NESCS, works on successive days can be considered as being undertaken over two consecutive years, i.e. 20 m³ total]</i>	May be met. If soil is retained on site (refer Section 6.3 for remediation options), then the permitted activity standard may be met.

Rule 8(3)	Permitted activity provisions	Evaluation
(e)	Soil taken away must be disposed of at an appropriately licensed facility.	Can be met (specified in this report).
(f)	The duration of land disturbance must be no longer than two months.	Unlikely to be met given the scale of the proposed works.
(g)	The integrity of a structure designed to contain contaminated soil, or other contaminated materials must not be compromised.	Not applicable.

Table 11. Evaluation of soil disturbance as a controlled activity under NESCS Rule 9(1) for 1320 Dairy Flat Highway

Rule 9(1)	Controlled activity provisions	Evaluation
(a)	A detailed site investigation of the piece of land must exist.	This report fulfils this requirement.
(b)	The report on the DSI must state that the soil contamination does not exceed the applicable standard in Regulation 7.	Not met as this report states that contamination exceeds the applicable standard in Regulation 7.
(c)	The consent authority must have the report.	Can be met if this report is provided to Council.
(d)	Conditions arising from the application of subclause (4), if there are any, must be complied with.	In our view this DSI report complies with the requirements of the subclause (2).

Table 12. Evaluation of subdivision and change in land use as a permitted activity under NESCS Rule 8(4) for 1320 Dairy Flat Highway

Rule 8(4)	Permitted activity provisions	Evaluation
(a)	A preliminary site investigation of the land or piece of land must exist.	This report fulfils this requirement.
(b)	The PSI must state that it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land.	Not met as the PSI shows there is a potential risk to human health from HAIL activities on 1320 Dairy Flat Highway in the context of the proposed use.
(c)	The report must be accompanied by a relevant site plan to which the report is referenced.	The figures provided in this report fulfil this requirement.
(d)	The consent authority must have the report and the plan.	Can be met if this report is provided to Council.

Table 13. Evaluation of subdivision and change in land use as a controlled activity under NESCS Rule 9(3) for 1320 Dairy Flat Highway

Rule 9(3)	Controlled activity provisions	Evaluation
(a)	A detailed site investigation of the piece of land must exist.	This report fulfils this requirement.
(b)	The report on the DSI must state that soil contamination does not exceed the applicable standard in Regulation 7.	Not met as this report states that contamination exceeds the applicable standard in Regulation 7.
(c)	The consent authority must have the report.	Can be met if this report is provided to Council.
(d)	Conditions arising from the application of subclause (4), if there are any, must be complied with.	In our view this DSI report complies with the requirements of the subclause (4).

6.2.2 Auckland Unitary Plan - Operative in Part

The Auckland Unitary Plan (AUP), Section E30 contains rules that address discharges to the environment, both during works and in the long term. The contaminated land rules of the AUP apply to soils that contain 'elevated levels of contaminants' which is defined as contaminants exceeding the permitted activity discharge criteria in Table E30.6.1.4.1. The rules apply when contamination levels exceed the permitted activity criteria and earthworks exceed 200 m³.

As detailed in **Section 4.5**, contaminants do not exceed the permitted activity criteria so **Section E30 rules do not apply to the site.**

6.3 Earthworks and construction

The key requirements for earthworks management during redevelopment at 1320 Dairy Flat Highway are summarised in Table 16. No other ground contamination-related requirements are necessary for the non-HAIL land parcels at 89 and 105 Lascelles Drive.

Table 16. Earthworks and implications for 1320 Dairy Flat Highway

<p>Demolition and SQEP inspection</p>	<p>An asbestos survey for demolition is recommended for the dwelling and should be undertaken by a Licensed Asbestos Assessor prior to demolition in accordance with the Health and Safety at Work (Asbestos) Regulation 2016.</p> <ul style="list-style-type: none"> Any identified ACM shall be removed under supervision by a Licensed Asbestos Removalist. Clearance certificates will be issued once any identified ACM has been removed on the buildings. The SQEP (i.e. WWLA) shall inspect the soil beneath the buildings for clearance purposes prior to excavation continuing within the building footprints. This is part of the overall clearance and works completion reporting process.
<p>Remediation</p>	<p>Remediation is required for arsenic-contaminated soils at 1320 Dairy Flat Highway. This area covers approximately 770 m² and assuming contamination to 0.2 m depth, represents a soil volume of approximately 160 m³ (insitu). The depth of contamination will need to be confirmed with validation sampling, and the HAIL area may also be able to be reduced with additional delineation sampling.</p> <p>There are multiple ways to approach remediation, and we have considered the most likely options:</p> <ul style="list-style-type: none"> Soil relocation: Contamination is below the applicable standards for commercial and recreational land uses so the contaminated soil could be relocated to a commercial or recreational part of the site. If this was to occur, there would be a requirement to document the final location of the soil and ensure that if the development plan was to ever change to allow residential redevelopment of that area, the soil would be removed/ remediated. While this has long-term implications, it does reduce upfront costs for off-site disposal. Soil mixing: If there is a desire to retain topsoil onsite, contaminated soils can be mixed with clean soils to achieve an overall lower contamination concentration. Given the concentration of arsenic present, a mixing ration of 2 parts clean soil (i.e. from paddock areas) to 1 part contaminated is likely to be sufficient to achieve a compliant result for 1320 Dairy Flat Highway (or 4:1 if it was to be used at Lascelles Drive). This is likely to be achieved via excavation and stockpiling in preparation for bulk earthworks. Validation sampling of stockpiles can be undertaken to confirm soil mixing is successful. Alternatively, contaminated soil can be excavated and disposed offsite to a managed fill facility. This may be a viable option given that Redvale Landfill is in close proximity to the site and often provides cheaper rates for low levels of contaminated soil that it can use as "daily cover". Validation sampling of the excavated area will be required to confirm that remediation has been successful. The benefit of this approach is that it removes contamination from the site permanently (although with higher upfront costs). Soils could also be capped (i.e. encapsulated beneath hardstand, buildings or similar) but given the nature of the works and the geotechnical limitations of topsoil, we consider this to be a less viable option.
<p>Earthworks controls</p>	<p>Standard earthworks controls apply to the site with a particular focus on minimising discharges.</p> <ul style="list-style-type: none"> Controls as set out in Auckland Council's GD05 – <i>Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region</i> will be applicable for the works, with particular focus on ensuring that there are no discharges of topsoil around structures at 1320 Dairy Flat Highway or runoff to surrounding sites. Dust must be managed in accordance with the Ministry for the <i>Environment Good Practice Guide for Assessing and Managing Dust</i>.
<p>Health and safety</p>	<ul style="list-style-type: none"> No contamination-related health and safety requirements are necessary, but it is good practice for workers to adhere to good hygiene practices, such as washing hands before eating and drinking, and brushing down boots before entering site sheds and vehicles.

Soil reuse	<ul style="list-style-type: none"> • Except for the remediation area at 1320 Dairy Flat Highway, soils may be reused on site without restriction. • Remediated soils will require either mixing with clean soils to achieve a compliant arsenic concentration (see above), or disposal offsite to an appropriately consented facility. 	
Surplus soil disposal	For offsite disposal:	
	<ul style="list-style-type: none"> • Topsoil and natural soil to ~0.4 m containing elevated arsenic: If surplus to site needs, soil will require disposal to a managed fill. Note, the depth of contamination needs to be confirmed via either further testing pre-works or validation sampling post-works. 	Managed fill.
Post-works reporting	<ul style="list-style-type: none"> • All natural subsoils in remediation area (>~0.4 m) and all other topsoil/ fill: All other surplus soils are suitable for disposal to cleanfill. 	Cleanfill

7. Conclusions

This report has been prepared to comply with the requirements of a PSI and DSI (ground contamination) and has been undertaken to support Stage 2 of the Auckland Surf Park project.

Key findings include:

- From at least 1940 to the late 1970s, the site was used for pasture. It was then developed for rural residential use over the late 1970s to early 1990s with all properties containing a combination of residences, sheds and animal handling facilities.
- At the desk study phase, the HAIL assessment suggested stockyards/ spray races/ drench use would trigger Activity A8, use of asbestos in building materials may also pose a potential risk of contamination (Activity E1), along with fill placement for a horse arena. No HAIL activities were identified for 89 Lascelles Drive at the desk study phase.
- Soil sampling showed that arsenic is elevated above applicable human health criteria in two locations at 1320 Dairy Flat Highway, likely associated with treated timber rather than related to Activity A8. Chromium and copper were also slightly elevated alongside arsenic. At the Lascelles Drive land parcels and the balance of 1320 Dairy Flat Highway contaminants are within expected background ranges.
- HAIL Activity I (treated timber use) is confirmed at 1320 Dairy Flat Highway given the presence of arsenic elevated above one of the proposed land use standards (high density residential). Rules in the NESCS apply to 1320 Dairy Flat Highway, with the activity status being restricted discretionary activity (Rule 10) for soil disturbance, subdivision and land use change. Consent is not required under the AUP Section E30 rules as there are no contaminants that exceed permitted activity criteria.
- Remediation of approximately 160 m³ of arsenic-contaminated soil is likely to be required, although this area may be reduced with delineation sampling. There are a range of remediation options available, including multiple ways to retain soil onsite in a safe manner. The attached SMP (**Appendix B**) provides guidance on earthworks controls during remediation and unexpected contamination protocols for bulk earthworks.

Appendix A. Laboratory Data



CERTIFICATE OF ANALYSIS

WWLA
 P O Box 314
 Kumeu 0841

Attention: Lauren Windross
 Phone: 022 088 1201
 Email: wendi.williamson@wwla.kiwi

Lab Reference: 25-19606
 Submitted by: Becki
 Date Received: 17/07/2025
 Testing Initiated: 12/08/2025
 Date Completed: 20/08/2025
 Order Number:
 Reference: WWLA1368

Sampling Site: Dairy Flat

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at ALS NZ (or at the subcontracted laboratories, when applicable). Samples were in acceptable condition unless otherwise noted on this report. Specific testing dates are available on request.

Heavy Metals in Soil

Client Sample ID			S1 0m 0m	S2 0m 0m	S3 0m 0m	HA1 0.1m 0.1m	HA2 0.1m 0.1m
Date Sampled			14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025
Analyte	Unit	Reporting Limit	25-19606-1	25-19606-2	25-19606-3	25-19606-4	25-19606-6
Arsenic	mg/kg dry wt	0.125	69.1	5.4	7.3	3.5	5.6
Cadmium	mg/kg dry wt	0.005	0.28	0.21	0.29	0.18	0.30
Chromium	mg/kg dry wt	0.125	43.5	12.6	11	9.4	9.9
Copper	mg/kg dry wt	0.075	62.1	25.0	19.1	34.2	29.5
Lead	mg/kg dry wt	0.25	26.9	9.54	15.2	16.4	15.3
Nickel	mg/kg dry wt	0.05	10.9	12.8	7.32	19.2	11.4
Zinc	mg/kg dry wt	0.05	139	87.3	231	30.7	27.3

Heavy Metals in Soil

Client Sample ID			HA3 0.1m 0.1m	HA3 0.3m 0.3m	HA4 0.1m 0.1m	HA5 0.1m 0.1m	HA6 0.1m 0.1m
Date Sampled			14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025
Analyte	Unit	Reporting Limit	25-19606-8	25-19606-9	25-19606-10	25-19606-12	25-19606-14
Arsenic	mg/kg dry wt	0.125	54.4	16.1	24.7	13.9	1.8
Cadmium	mg/kg dry wt	0.005	0.510	0.094	0.551	0.46	0.14
Chromium	mg/kg dry wt	0.125	76.4	8.7	22.6	12	4.9
Copper	mg/kg dry wt	0.075	83.7	19.4	43.7	29.0	8.47
Lead	mg/kg dry wt	0.25	15.6	12.5	22.8	15.7	6.39
Nickel	mg/kg dry wt	0.05	9.58	6.45	8.93	6.07	4.2
Zinc	mg/kg dry wt	0.05	137	21.4	69.8	63.0	12.7

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited.
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Heavy Metals in Soil

Client Sample ID			HA7 0.1m 0.1m	HA8 0.5m 0.5m	HA8 1.0m 1.0m	HA9 0.1m 0.1m	HA10 0.1m 0.1m
Date Sampled			14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025
Analyte	Unit	Reporting Limit	25-19606-16	25-19606-18	25-19606-19	25-19606-20	25-19606-21
Arsenic	mg/kg dry wt	0.125	1.2	1.2	0.84	8.9	1.4
Cadmium	mg/kg dry wt	0.005	0.23	0.40	0.026	0.40	0.30
Chromium	mg/kg dry wt	0.125	5.7	4.9	4.8	16.1	5.7
Copper	mg/kg dry wt	0.075	11.1	4.6	2.8	49.2	10.2
Lead	mg/kg dry wt	0.25	6.12	7.21	6.10	5.65	5.99
Nickel	mg/kg dry wt	0.05	5.84	2.8	1.1	10.5	4.7
Zinc	mg/kg dry wt	0.05	16.3	16.5	4.6	114	18.1

Organochlorine Pesticides - Soil

Client Sample ID			HA3 0.1m 0.1m	HA3 0.3m 0.3m	HA4 0.1m 0.1m	HA5 0.1m 0.1m	HA9 0.1m 0.1m
Date Sampled			14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025
Analyte	Unit	Reporting Limit	25-19606-8	25-19606-9	25-19606-10	25-19606-12	25-19606-20
TCMX (Surrogate)	%	1	85	82	82	85	83
2,4'-DDD	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
2,4'-DDE	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
2,4'-DDT	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
4,4'-DDD	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
4,4'-DDE	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
4,4'-DDT	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
alpha-BHC	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Aldrin	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
beta-BHC	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
cis-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Chlordane (sum)	mg/kg dry wt	0.02	<0.020	<0.020	<0.020	<0.020	<0.020
cis-Nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
delta-BHC	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Total DDT	mg/kg dry wt	0.02	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200
Dieldrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endosulfan I	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan II	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endosulfan sulfate	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin	mg/kg dry wt	0.05	<0.050	<0.050	<0.050	<0.050	<0.050
Endrin aldehyde	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Endrin ketone	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
gamma-BHC	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Heptachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Heptachlor epoxide	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Hexachlorobenzene	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
Methoxychlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-nonachlor	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010
trans-Chlordane	mg/kg dry wt	0.01	<0.010	<0.010	<0.010	<0.010	<0.010

PAH in Soil (Routine)

Client Sample ID			HA8 0.5m 0.5m	HA8 1.0m 1.0m
Date Sampled			14/07/2025	14/07/2025
Analyte	Unit	Reporting Limit	25-19606-18	25-19606-19
1-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010
2-Methylnaphthalene	mg/kg dry wt	0.01	<0.010	<0.010
Acenaphthene	mg/kg dry wt	0.01	<0.010	<0.010
Acenaphthylene	mg/kg dry wt	0.01	<0.010	<0.010
Anthracene	mg/kg dry wt	0.01	<0.010	<0.010
Benz[a]anthracene	mg/kg dry wt	0.02	<0.020	<0.020
Benzo[a]pyrene	mg/kg dry wt	0.01	<0.010	<0.010
Benzo[b]&[j]fluoranthene	mg/kg dry wt	0.02	<0.020	<0.020
Benzo[g,h,i]perylene	mg/kg dry wt	0.02	<0.020	<0.020
Benzo[k]fluoranthene	mg/kg dry wt	0.01	<0.010	<0.010
Chrysene	mg/kg dry wt	0.01	<0.010	<0.010
Dibenz(a,h)anthracene	mg/kg dry wt	0.01	<0.010	<0.010
Fluoranthene	mg/kg dry wt	0.02	<0.020	<0.020
Fluorene	mg/kg dry wt	0.01	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	0.01	<0.010	<0.010
Naphthalene	mg/kg dry wt	0.01	<0.010	<0.010
Phenanthrene	mg/kg dry wt	0.01	<0.010	<0.010
Pyrene	mg/kg dry wt	0.02	<0.020	<0.020
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	0.03	0.030	0.030
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	0.01	<0.010	<0.010
Anthracene-d10 (Surrogate)	%	1	94	96

Moisture Content

Client Sample ID			HA8 0.5m 0.5m	HA8 1.0m 1.0m
Date Sampled			14/07/2025	14/07/2025
Analyte	Unit	Reporting Limit	25-19606-18	25-19606-19
Moisture Content	%	1	29	26

Method Summary

- Elements in Soil** Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.
- OCP in Soil** Samples are extracted with hexane, pre-concentrated then analysed by GC-MSMS. (Chlordane (sum) is calculated from the main actives in technical Chlordane: Chlordane, Nonachlor and Heptachlor). (In accordance with in-house procedure).
- Total DDT** Sum of DDT, DDD and DDE (4,4' and 2,4 isomers)
- PAH in Soil** Solvent extraction, followed by GC-MS analysis.
Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH.
Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation.
 Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to 'Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health'. Ministry for the Environment. 2011. (In accordance with in-house procedure).
- Moisture** Moisture content is determined gravimetrically by drying at 103 °C.



Thara Samarasinghe, B.Sci.
Senior Laboratory Technician



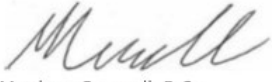
Samantha Hill
Senior Laboratory Technician



Divya Goundar
Senior Lab Technician, DipSciTech



Lekeisha Tanner
Laboratory Technician



Matthew Counsell, B.Sc.
Environmental Lab Manager

Certificate of Analysis

Client Williamson Water and Land Advisory
Client Contact Wendi Williamson
Phone Number [REDACTED]
Email [REDACTED]
Address 10/1 Putaki Drive, Kumeu, Auckland



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

IANZ# 1308

Certificate ID	Q-01541	Date Sampled ²	14/07/2025
Samples Taken By ²	Becki Williamson	Date Sample(s) Received	16/07/2025
Project Reference ²	WWLA1368	Date Sample(s) Analysed & Issued	18/07/2025
Site Address ²	WWLA1368		
Location Sample Analysed	Eurofins Environment Testing 35 O'Rorke Road, Penrose, Auckland 1061		

Lab ID	Sample ID ²	Sample Details ²	Sample type	Sample size ² /g	Fibres Identified
1	S1	0 m	Soil	138.4	ORF, NAD

Opinions and interpretations expressed herein are outside the scope of Eurofins Environment Testing 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		

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 for Qualitative Identification of Asbestos in Bulk Samples.
- Eurofins Environment Testing 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 ² 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	<p>Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples by polarised light microscopy (PLM) and dispersion staining (DS) techniques.</p> <p>NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.</p>
Unknown Mineral Fibres	<p>Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.</p> <p>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.</p>
Bonded asbestos containing material (ACM)	<p>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.</p> <p>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.</p>
Limit of Reporting	<p>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.</p>

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 1 month after analysis.

Description	Testing Site	Extracted	Holding Time
AS4964-2004	Auckland	18/07/2025	Indefinite

Comments

Asbestos Counter/Identifier:

Elsie Xu

Analyst-Asbestos



Elsie Xu

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](#).

This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the homogeneity of the product.

This document can only be reproduced in full.

Accreditation does not apply to comments or graphical representations.

Unless otherwise stated, all tests in this analytical report (except for subcontracted tests) are performed at Auckland laboratory.

The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

Eurofins may subcontract the performance of part or all of the Services to a third party and the Customer authorises the release of all information necessary to the third party for the provision of the Services.

All samples become the property of Eurofins to the extent necessary for the performance of the Services.

Eurofins will not be required to store samples and may destroy or otherwise dispose of the samples or return the samples to the Customer (at the Customer's cost in all respects) immediately following analysis of the samples.

If the Customer pays for storage of the samples Eurofins will take commercially reasonable steps to store the samples for the agreed period in terms of industry practice. The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.

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Eurofins shall have no liability for any indirect or consequential loss including, without limitation, loss of production, loss of contracts, loss of profits, loss of business or costs incurred from business interruption, loss of opportunity, loss of goodwill or damage to reputation and cost of product recall (including any losses suffered as a result of distribution of the Customer's products subject of the Services prior to the report being released by Eurofins). It shall further have no liability for any loss, damage or expenses arising from the claims of any third party (including, without limitation, product liability claims) that may be incurred by the Customer.

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Appendix B. Draft Site Management Plan (Ground Contamination)



Site Management Plan (Ground Contamination) (DRAFT)

Site ID: Auckland Surf Park Community: Stage 2 Rev 1, 30 September 2025

Overview:

AW Holdings 2021 Ltd is developing the Auckland Surf Park, on properties on Dairy Flat Highway and Lascelles Drive, Dairy Flat. The project includes accommodation, residential and work-live units, a data centre and a solar farm.

Stage 1 works are underway with contamination largely remediated. This SMP relates to Stage 2 works with a focus on remediation requirements at 1320 Dairy Flat Highway. There are also protocols for responding to unexpected contamination across the wider Stage 2 site, including at 89 and 105 Lascelles Drive. Refer Figure 1.

Williamson Water & Land Advisory (WWLA) has undertaken a preliminary and detailed site investigation (PSI/DSI)¹ of the Stage 2 site which found:

- The site history review confirmed that the site has only been used for pastoral agricultural purposes and lifestyle blocks since the 1940s.
- Localised surficial soils at 1320 Dairy Flat Highway contain contamination from use of treated timber (Activity I on the Hazardous Activities and Industries List (HAIL)). Arsenic in two areas requires remediation in topsoil and shallow natural soil, provisionally estimated to be to 0.2 m below ground over a 770 m² area (i.e. 160 m³ insitu) (refer **Figure 2**).
- Remediation options are set out in detail in the PSI/ DSI and may involve either removal of the impacted soil from site, relocation within the site, soil mixing, or encapsulation.
- There is potential to undertake delineation sampling to further define the extent of arsenic contaminated soils.

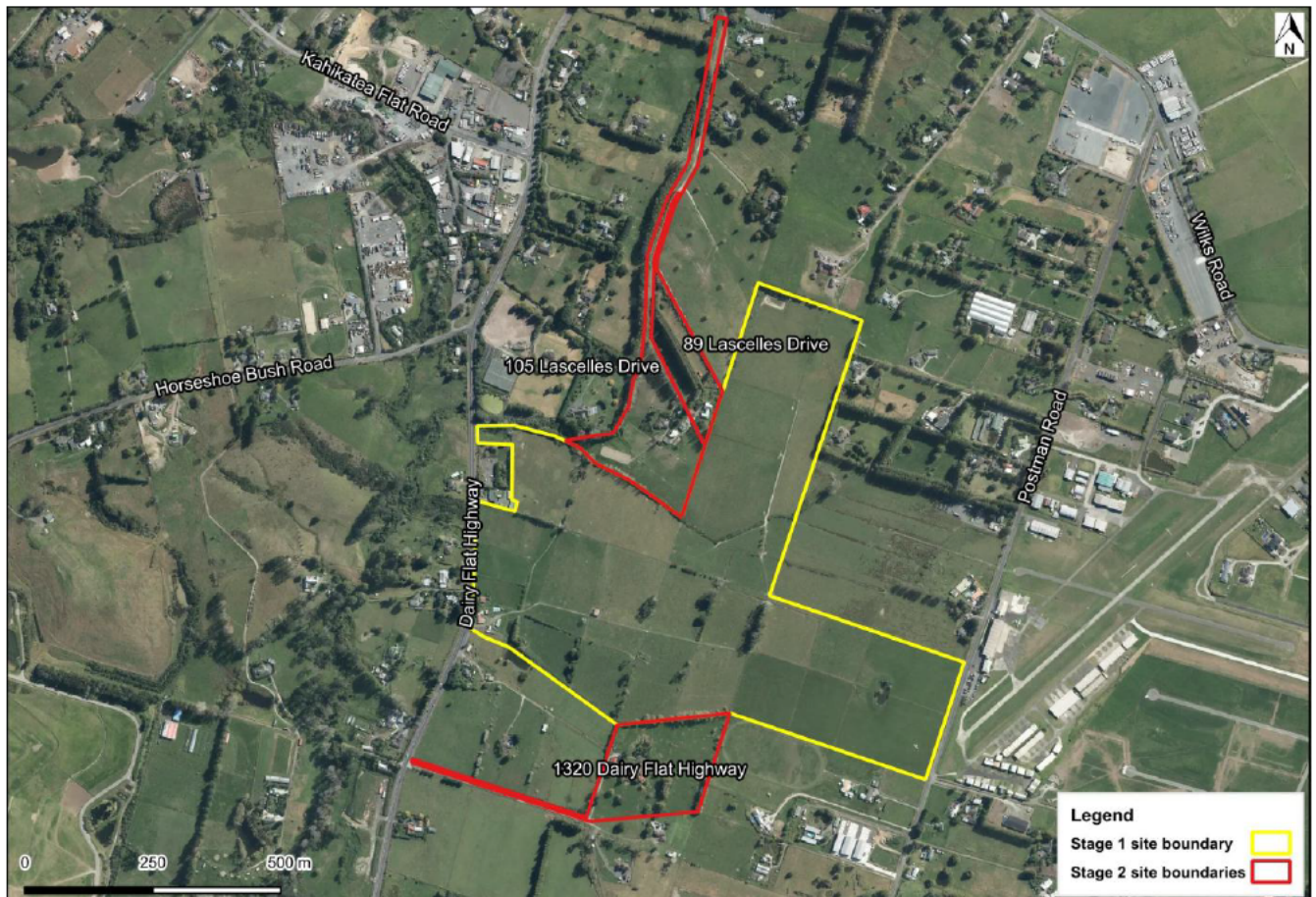


Figure 1. Site location, outlined in red dash with stage one area in solid red (image source: Land Information New Zealand (LINZ), 2024-2025).

¹ Auckland Surf Park: Stage 2, Preliminary and Detailed Site Investigation (Ground Contamination). Report prepared for AW Holdings 2021 Ltd by Williamson Water & Land Advisory Ltd, dated 30 September 2025. Reference: WWLA1368, Rev. 1.

This SMP has been prepared to support the remediation and provides procedures to guide contractors in materials management, efficient onsite reuse, offsite disposal (if necessary), health and safety and across the wider project, response to unexpected contamination encounters.

The contractor is responsible for following the requirements of the SMP and reporting on compliance to the SQEP. Where input is required by a SQEP (i.e. WWLA), it is **highlighted** below.

Procedures understood by the Contractor:	Date:
Induction given by SQEP:	Date:



Task	Description	Check
Pre-works requirements	<ul style="list-style-type: none"> Obtain an asbestos survey of the buildings at 1320 Dairy Flat Highway and carry out demolition in accordance with the Asbestos Regulations if asbestos is present. 	<input type="checkbox"/>
	<ul style="list-style-type: none"> While not compulsory, pre-works sampling is recommended to further delineate the area of remediation, and the depth, as this may reduce the volume of contaminated soil that requires management. Refer to Figure 2 for the HAIL/ remediation plan. The SQEP will determine the sampling plan; provisionally: <ul style="list-style-type: none"> Sampling at 0.4 and 0.5 m depth in two locations in the yards. Sampling on a 10 m grid around the dwelling, at surface, 0.3, 0.4 and 0.5 m bgl. Testing of (selected) samples at an IANZ accredited laboratory for arsenic. 	<input type="checkbox"/>
	<ul style="list-style-type: none"> Confirm the remediation method. Refer to PSI/ DSI for detailed description <ul style="list-style-type: none"> Remediation Method chosen: _____ If soil is to be retained on site, final proposed destination: _____ If offsite disposal is proposed, state destination: _____ 	<input type="checkbox"/>
	<ul style="list-style-type: none"> Inform the SQEP of works commencement date and arrange induction for this SMP. 	<input type="checkbox"/>
	<ul style="list-style-type: none"> Arrange permits if soil is to be disposed offsite. 	<input type="checkbox"/>



Figure 2. HAIL Areas (remediation areas) and PSI/ DSI sampling locations.

Hold Point: Confirm remediation method and area. SQEP to update SMP to final version

Task	Description	Check	
Site establishment	<ul style="list-style-type: none"> Establish earthworks controls according to Auckland Council's Guideline Document 2016/005, "Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (GD05)" The remediation area requires separate erosion and sediment control to prevent cross-contamination of cleaner soils (unless soil mixing is proposed). 	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Establish dust controls in accordance with the Ministry for the Environment's <i>Good Practice Guide for Assessing and Managing Dust (2016)</i>, including: <ul style="list-style-type: none"> Regular wetting of the work area and exposed soils. Use of suppression methods that minimise over wetting and surface water runoff, such as hand-held hose with sprinkler nozzle for small areas or misting lines for larger areas. 	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Induct new workers/ subcontractors to requirements of this plan as works progress. 	<input type="checkbox"/>	
Contamination health and safety requirements	<ul style="list-style-type: none"> There are no specific contamination-related health and safety requirements for workers during disturbance of soil. 	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Good hygiene practices should always be followed, such as washing hands before eating and drinking and cleaning boots before entering site sheds or vehicles. 	<input type="checkbox"/>	
Dust controls	<ul style="list-style-type: none"> Maintain dust controls for the duration of soil disturbance works as per MfE <i>Good Practice Guide for Assessing and Managing Dust (2016)</i>. 	<input type="checkbox"/>	
Sediment controls	<ul style="list-style-type: none"> Maintain erosion and sediment controls for the duration of soil disturbance works. 	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Undertake daily checks of remediation area to ensure controls are in good condition. 	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Inspect controls after any storms and regularly, according to the site erosion and sediment control plan (ECSP). 	<input type="checkbox"/>	
Spoil reuse	<ul style="list-style-type: none"> Contaminated topsoil from the remediation area can only be reused in areas where commercial or recreational land use is proposed, unless soil mixing has taken place to reduce contamination concentrations to those appropriate for residential use. The <i>SQEP will confirm on completion of pre-works sampling and remediation decision making</i>. Surplus subsoils (i.e. materials underlying topsoil) and topsoil from the remainder of site are not contaminated and can be placed anywhere on site. 	<input type="checkbox"/>	
Offsite disposal of surplus spoil (all subject to prior approval from disposal site)	Remediation materials (to ~0.2 m in remediation/ HAIL Area)	Managed Fill. If soil is being taken to a transitional facility (e.g. a contractor's yard), the final disposal destination must also be confirmed.	<input type="checkbox"/>
	All other soils	Expected to be suitable for disposal as cleanfill.	<input type="checkbox"/>
Offsite transport of surplus spoil	<ul style="list-style-type: none"> As a minimum, all loads shall be dampened and securely covered. 	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Truck loads shall be tracked and weighbridge dockets retained and <i>provided to the SQEP</i> to confirm appropriate disposal. 	<input type="checkbox"/>	
Imported materials	<ul style="list-style-type: none"> Ensure any imported materials (soil, recycled hardfill/concrete etc.) are clean. These must be either quarry sourced or <i>verified by the SQEP</i> as being from a non-HAIL site or cleanfill as defined in the Auckland Unitary Plan. 	<input type="checkbox"/>	

Task	Description	Check
	 <p data-bbox="363 734 480 763">Fill materials.</p>	 <p data-bbox="938 734 1054 763">Fill materials.</p>
Post works <i>(provide to SQEP)</i>	<ul style="list-style-type: none"> <li data-bbox="368 779 1385 808">• Photographic records of the soil disturbance works (e.g. areas of cut, areas of fill etc.) <li data-bbox="368 824 1385 887">• Details of the locations where soil from the remediation area has been reused/ placed on the site (if applicable) <li data-bbox="368 902 1385 931">• Weighbridge summary of soil disposed from site to managed fill (if any). <li data-bbox="368 947 1385 976">• Details of any health and safety or environmental incidents during soil disturbance. 	<input data-bbox="1449 779 1473 808" type="checkbox"/> <input data-bbox="1449 824 1473 853" type="checkbox"/> <input data-bbox="1449 902 1473 931" type="checkbox"/> <input data-bbox="1449 947 1473 976" type="checkbox"/>
Validation reporting	<ul style="list-style-type: none"> <li data-bbox="368 996 1385 1124">• <i>The SQEP</i> shall prepare a site validation report within one month of earthworks completion, detailing the results of validation sampling (refer above), the post-works information provided by contractor(s) (above), and general compliance with this SMP and relevant resource consent conditions. 	<input data-bbox="1449 996 1473 1025" type="checkbox"/>

Attachments:

Laboratory data for disposal permitting (if required)



Table A1. Summary soil analytical results

Sample information	Sample Location	NESCS commercial/ industrial/ outdoor worker ¹	NESCS high-density residential ¹	NESCS residential (10% produce) ¹	AUP permitted activity discharge criteria ²	Published background (non-volcanic) ³	1320 Dairy Flat Highway							89 Lascelles Drive			105 Lascelles Drive					
	Depth (m bgl)						S1	HA1	HA2	HA3		HA4	HA5	S2	S3	HA10	HA6	HA7	HA8		HA9	
	Date						0 m	0.1 m	0.1 m	0.1 m	0.3 m	0.1 m	0.1 m	0 m	0 m	0.1 m	0.1 m	0.1 m	0.5 m	1.0 m	0.1 m	
	Material type						14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025	14/07/2025
Asbestos	ACM (bonded) % w/w ⁵	0.05	0.04	0.01	-	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-		
	AF+FA* %w/w ⁵	0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Metals	Arsenic	70	45	20	100	12	69.1	3.5	5.6	54.4	16.1	24.7	13.9	5.4	7.3	1.4	1.8	1.2	1.2	0.84	8.9	
	Cadmium	1,300	230	3	7.5	0.65	0.28	0.18	0.3	0.51	0.094	0.551	0.46	0.21	0.29	0.3	0.14	0.23	0.4	0.026	0.4	
	Chromium	6,300	1,500	460	400	55	43.5	9.4	9.9	76.4	8.7	22.6	12	12.6	11	5.7	4.9	5.7	4.9	4.8	16.1	
	Copper	>10,000	>10,000	>10,000	325	45	62.1	34.2	29.5	83.7	19.4	43.7	29	25	19.1	10.2	8.47	11.1	4.6	2.8	49.2	
	Lead	3,300	500	210	250	65	26.9	16.4	15.3	15.6	12.5	22.8	15.7	9.54	15.2	5.99	6.39	6.12	7.21	6.1	5.65	
	Nickel	6,000 ⁴	1,200 ⁴	400 ⁴	105	35	10.9	19.2	11.4	9.58	6.45	8.93	6.07	12.8	7.32	4.7	4.2	5.84	2.8	1.1	10.5	
	Zinc	400,000 ⁴	60,000 ⁴	7,400 ⁴	400	180	139	30.7	27.3	137	21.4	69.8	63	87.3	231	18.1	12.7	16.3	16.5	4.6	114	
OCPs	All tested	-	-	-	-	-	-	-	-	<LR	<LR	<LR	<LR	-	-	-	-	-	-	-	<LR	
PAHs	All tested	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<LR	<LR	-

All values are presented in mg/kg except where noted (asbestos).

*FA = fibrous asbestos, AF = asbestos fines.

ND denotes no asbestos detected.

<LR indicates concentration below the laboratory limit of reporting.

Grey values are below expected background values, black values exceed background concentrations, bold values exceed the human health criteria applicable to that property

1. MfE, 2011 Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated). Soil Contamination Standard - Commercial/industrial land use, standard residential (10% produce) and high-density residential use as appropriate

2. Auckland Unitary Plan permitted activity discharge criteria (Standard E30.6.14).

3. Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of Inorganic Elements in Soils from the Auckland Region.

4. National Environment Protection Council [Australia] - National Environment Protection Measure (Assessment of Site Contamination). Health Investigation Levels - Commercial/industrial land use (HIL D), residential (HIL A) and high density residential (HIL B) as appropriate

5. BRANZ, 2024. New Zealand Guidelines for Assessing and Managing Asbestos in Soil.