FOCUS
ENVIRONMENTAL SERVICES LTD

18 December 2024

Winton Land Limited

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PO Box 11455

Ellerslie

Auckland 1542

Attention: David Osborne

Re: Preliminary and Detailed Site Investigations for the Sunfield Urban Development Area, Papakura.

Job Reference FES 1804.001 (R1)

Dear David,

Please find a summary of the Preliminary Site Investigations and Detailed Site Investigations, conducted for the nineteen properties located within the proposed Sunfield Urban Development Area (UDA), Papakura.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out Preliminary Site Investigations (PSI's) and Detailed Site Investigations (DSIs) of the Sunfield UDA area, located in Papakura. The reports completed for the nineteen properties are listed below and are attached to this summary:

- *'Detailed Site Investigation 55 Cosgrave Road & 55A Cosgrave Road, Ardmore, Auckland (R5)'* dated December 2023 and prepared by Focus Environmental Services Limited (FES 1443.008 (R5));
- *'Detailed Site Investigation SECT 5 SO 495342, SECT 6 SO 495342 Old Wairoa Road & 55A Cosgrave Road, Ardmore, Auckland (R5)'* dated December 2023 and prepared by Focus Environmental Services Limited (FES 1443.013 (R5));
- *'Detailed Site Investigation Lot 1 DP5548 Cosgrave Road, Ardmore, Auckland (R5)'* dated December 2023 and prepared by Focus Environmental Services Limited (FES 1443.011 (R5));
- *'Detailed Site Investigation Lot 4 DP 55480 Old Wairoa Road, Ardmore, Auckland (R5)'* dated December 2023 and prepared by Focus Environmental Services Limited (FES 1443.012 (R5));
- *'Detailed Site Investigation, Remediation Action Plan & Assessment of Environmental Effects 508 Old Wairoa Road, Ardmore, Auckland (R5)'* dated December 2023 and prepared by Focus Environmental Services Limited (FES 1443.010 (R5));
- '*Preliminary Site Investigation 85 Hamlin Road, Ardmore, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.002);
- *'Detailed Site Investigation, Remediation Action Plan and Assessment of Environmental Effects 80 Hamlin Road, Ardmore, Auckland (R1)'* dated December

2023 and prepared by Focus Environmental Services Limited (FES 1443.009 (R1));

- '*Detailed Site Investigation, Remediation Action Plan & Assessment of Environmental Effects 279 Airfield Road, Ardmore, Auckland (R1)*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1686.001 (R1));
- '*Preliminary Site Investigation 92 Hamlin Road, Ardmore, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.003);
- '*Preliminary Site Investigation 143 Cosgrave Road, Papakura, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.009);
- '*Preliminary Site Investigation 131 Cosgrave Road, Papakura, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.008);
- '*Preliminary Site Investigation 121A Cosgrave Road, Papakura, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.006);
- '*Preliminary Site Investigation 123 Cosgrave Road, Ardmore, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.007);
- '*Preliminary Site Investigation 119A Cosgrave Road, Papakura, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.005);
- '*Preliminary Site Investigation 119 Cosgrave Road, Ardmore, Auckland*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1804.004); and
- '*Preliminary Site Investigation 101 & 103 Cosgrave Road, Ardmore, Auckland (R2)*' dated December 2023 and prepared by Focus Environmental Services Limited (FES 1443.019 (R2)).

Site Identification

The Sunfield UDA consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland as shown in Figure 1 attached. It is proposed that these properties will be redeveloped for residential land use. The site identification details are provided in Table 1 below:

Table 1: Site Identification Details

Physical Address	Legal Description	Area (ha)	Report
55 Cosgrave Road	SECT 3 SO 495342, SECT 4 SO 495342	9.24	DSI
SECT 5/6 Old Wairoa Road	SECT 5 SO 495342, SECT 6 SO 495342	11.81	DSI
Lot 1 Cosgrave Road	Lot 1 DP 55480	5.80	DSI
Lot 4 Old Wairoa Road	Lot 4 DP 55480	10.36	DSI
508 Old Wairoa Road	DP 10383	23.63	DSI, RAP & AEE
85 Hamlin Road	Lot 8 Deeds Reg WHAU 38	22.52	PSI
80 Hamlin Road	PT Lot 2 DP 22141, Lot 2 DP 21397, Lot 1 DP 21397, Lot 5 DP 12961, Pt Lot 4 DP 12961	117.50	DSI, RAP & AEE
279 Airfield Road	Lot 2 BLK XV DP 199521	14.42	DSI, RAP & AEE
92 Hamlin Road	Lot 1 DP 46615	0.091	PSI
143 Cosgrave Road	Lot 1 DP 103787	3.04	PSI
131 Cosgrave Road	Lot 2 DP 103787	3.04	PSI
121A Cosgrave Road	Lot 3 DP 103787 – 1/3 SH In Lot 7 DP 103787	3.04	PSI
123 Cosgrave Road	Lot 4 DP 103787 - 1/3 SH In Lot 7 DP 103787	8.63	PSI
119A Cosgrave Road	Lot 5 DP 103787 - 1/3 SH In Lot 7 DP 103787	3.04	PSI
119A, 121A, 123 Cosgrave Road	Lot 7 DP 103787	0.08	PSI
119 Cosgrave Road	Lot 6 DP 103787	3.04	PSI
101 Cosgrave Road	PT ALLOT 1 DP 45156	1.94	PSI
103 Cosgrave Road	Lot 1 DP 62629	0.081	PSI
55A Cosgrave Road	SECT 1 SO 495342, SECT 2 SO 495342	2.93	DSI

The sites vary in shape from rectangular to irregular. The properties of 55, 55A, 101 & 103 Cosgrave Road and Sect 5-6, Lot 1 & Lot 4 Old Wairoa Road are zoned 'Future Urban Zone' under the Auckland Unitary Plan: Operative in Part (AUP: OP). The

property at 508 Old Wairoa Road is partially zoned 'Future Urban Zone' and partially zoned 'Rural – Mixed Rural Zone' under the AUP: OP. The remainder of the properties in the Sunfield UDA are zoned 'Rural – Mixed Rural Zone' under the AUP: OP.

An individual PSI (comprising a desktop assessment) was completed for eleven properties within the Sunfield UDA, and individual DSIs (comprising a desktop assessment, site visit and sampling) were completed for eight properties within the Sunfield UDA (see Table 1). The PSIs & DSIs have been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

As part of the desktop assessment conducted for each site, the histories of the sites were researched by Focus Environmental Services Limited personnel, which involved a review of the available historical aerial photographs for each site. In addition, for the sites at 55 & 55A, Lot 1, 123, 119, 101 & 103 Cosgrave Road, SECT 5/6, Lot 4 & 508 Old Wairoa Road, 80 & 92 Hamlin Road and 279 Airfield Road one or a combination of the following was conducted:

- A review of the Auckland Council property file;
- An enquiry to Auckland Council's Environmental Health Unit of the Licensing and Compliance Services Department; and
- a review of the Historic Certificate of Title.

During the review of the available information any potentially contaminating activities or land uses were identified.

The information obtained of the sites' history was assessed to determine if any potentially hazardous activities listed on the Hazardous Activities and Industries List (HAIL) had occurred on site as a result of past or current land use.

Potentially Contaminating Activities or Land Uses

The following potential contaminating land uses and/or activities were identified during the desktop assessments for the Sunfield UDA, and are presented in Table 2 below.

Table 2: Potential Contaminating Land Uses and/or Activities

Physical Address	Potentially Contaminating activities
55 & 55A Cosgrave Road SECT 5/6 Old Wairoa Road	• Horticultural Activities & Pesticide Use; • Maintenance and Use of Lead-based Paint; and • Demolition of Historic Structures Potentially Containing Asbestos, Products Potentially Containing Asbestos in a Degraded Condition, and Potentially Asbestos Containing Material intermixed with the Site Soils
80 Hamlin Road	• Livestock Dip or Spray Race Operations; • Bulk Tyre Storage; • Maintenance and Use of Lead-based Paint; • Demolition of Historic Structures Potentially Containing Asbestos; • Horticultural Activities; • Bulk Storage of Petroleum; • Bulk Storage of Chemicals; and • Treated Timber
279 Airfield Road	• Spray drift from Neighbouring Historic Horticultural Activities; • Livestock Dip or Spray Race Operations; • Demolition of Historic Structures Potentially Containing Asbestos, Products Potentially Containing Asbestos in a Degraded Condition, and Potentially Asbestos Containing Material intermixed with the Site Soils; • Maintenance and Use of Lead-based Paint; and • Burning of Refuse
508 Old Wairoa Road	• Livestock Dip or Spray Race Operations; • Demolition/ Burning of Historic Structures Potentially Containing Asbestos, Asbestos and Potentially Asbestos Containing Materials Intermixed with the Site Soils; • Maintenance and Use of Lead-based Paints; • Potentially Uncertified Filling; and • Burning of Buildings
Lot 1 Cosgrave Road Lot 4 Old Wairoa Road	• Historical Horticulture/ Persistent Pesticide Use

These were sampled as part of DSIs completed for 55 & 55A Cosgrave Road, 80 Hamlin Road, 279 Airfield Road, 508 Old Wairoa Road, Lot 1 Cosgrave Road, Lot 4 Cosgrave Road and SECT 5/6 Old Wairoa Road, Papakura.

Following the desktop assessment, the sites for which DSIs were completed (as shown in Table 2) were visited and a site inspection and walk over was carried out. The sites were inspected by Focus Environmental Services Limited personnel between December 2020 and August 2022.

During the site inspections, any potentially contaminating activities or land uses were identified.

Based on the results of the PSI and DSIs, it is considered that an activity described in the Hazardous Activities and Industries List (HAIL) has been, or is currently being, carried out on all the properties within the Sunfield Urban Development Area.

The results of the DSIs concluded that elevated concentrations of heavy metals and asbestos fibres were detected in the site soils of the properties at 508 Old Wairoa Road, 80 Hamlin Road and 279 Airfield Road. In addition, visual asbestos containing material (ACM) was observed at 80 Hamlin Road and 279 Airfield Road. Elevated concentrations of pentachlorophenol (PCP) were detected in the soils at 80 Hamlin Road. Due to the concentrations being above the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption) as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and/or the discharge criteria as outlined in the AUP: OP, remediation of the soils at these three properties will be required prior to development of the sites.

It is therefore considered that the regulations of the NES will likely be triggered by future residential development of the properties at 508 Old Wairoa Road, 80 Hamlin Road and 279 Airfield Road of the Sunfield UDA, Papakura. The regulations of the NES may be triggered by future residential development of the remaining properties of the Sunfield UDA for which DSIs have not yet been conducted.

Due to the estimated volume of material containing concentrations of contaminants elevated above those values specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, being 7757.08m^3, which is above the threshold of 200 m^3 it is considered that the proposed remediation will not meet the permitted activity requirements under rule E30.6.1.2 of the AUP: OP.

In addition, elevated concentrations of heavy metals and polycyclic aromatic hydrocarbons (PAH's) were detected above the cleanfill criteria in localised areas of the site at 508 Old Wairoa Road. Concentrations of heavy metals, PAH's, total petroleum hydrocarbons (TPH's) and asbestos were detected above the cleanfill criteria in multiple areas of the site at 80 Hamlin Road. Concentrations of lead and organochlorine pesticides (OCP's) were detected above the cleanfill criteria in specific areas across the site at 279 Airfield Road. Therefore, the soils in these areas will require management during site development.

The volumes of soil requiring remediation at the sites located within the Sunfield UDA, and as detailed above, are presented in Table 3 below.

Table 3: Volume of Soils Requiring Remediation

Physical Address	Quantity (m^3)
508 Old Wairoa Road	7206.7
80 Hamlin Road	492.0
279 Airfield Road	58.38
Total Volume	**7757.08**

DSI's for eleven of the properties comprising the Sunfield UDA were not possible at the time of the site walkovers and inspections due to inaccessibility to test the sites' soils. Prior to a detailed site investigation of the site, management of the soils at these properties will be required during future development works. Therefore, a site management plan (SMP) has been prepared outlining the mitigation and controls to be implemented during any soil disturbance occurring on site. In addition, the SMP outlines the sampling procedures to be completed.

It is therefore considered that the regulations of The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011, as summarised in the Human Health and Environmental Protection Criterion attached, will be triggered by future residential development of the properties within the Sunfield Urban Development Area, Papakura.

Discussion and Conclusion

Site-specific Remediation Action Plans (as outlined in Table 1) or a global Site Management Plan (applicable to all sites for which a DSI was unable to be conducted) have been prepared to ensure that the soils contaminated above the adopted site assessment criteria and the materials above the cleanfill criteria are handled, removed, or managed in a controlled manner and/or disposed of to a suitable disposal location. All earthworks required as part of the remedial works should be carried out in accordance with the prepared plans.

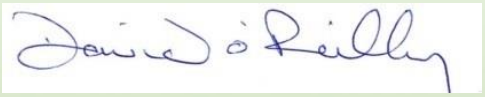
An assessment of the effects which may occur as a result of the proposed works has been made in order to mitigate any potential adverse environmental and/or human health effects. If the controls outlined in the RAP's/SMP are implemented during the development works, it is considered that the effects on the environment and human health will be effectively mitigated.

It should be noted that as remediation is required at 508 Old Wairoa Road, 80 Hamlin Road and 279 Airfield Road, Papakura, Site Validation Reports will be required for submission to Auckland Council following remedial works.

The Site Validation Reports shall be prepared in accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (MfE, Revised 2021) by a suitably qualified and experienced contaminated land professional.

Thank you for the opportunity to work with you and we look forward to being of further assistance. Please contact David O'Reilly on 027 5567995 if you have any queries or concerns.

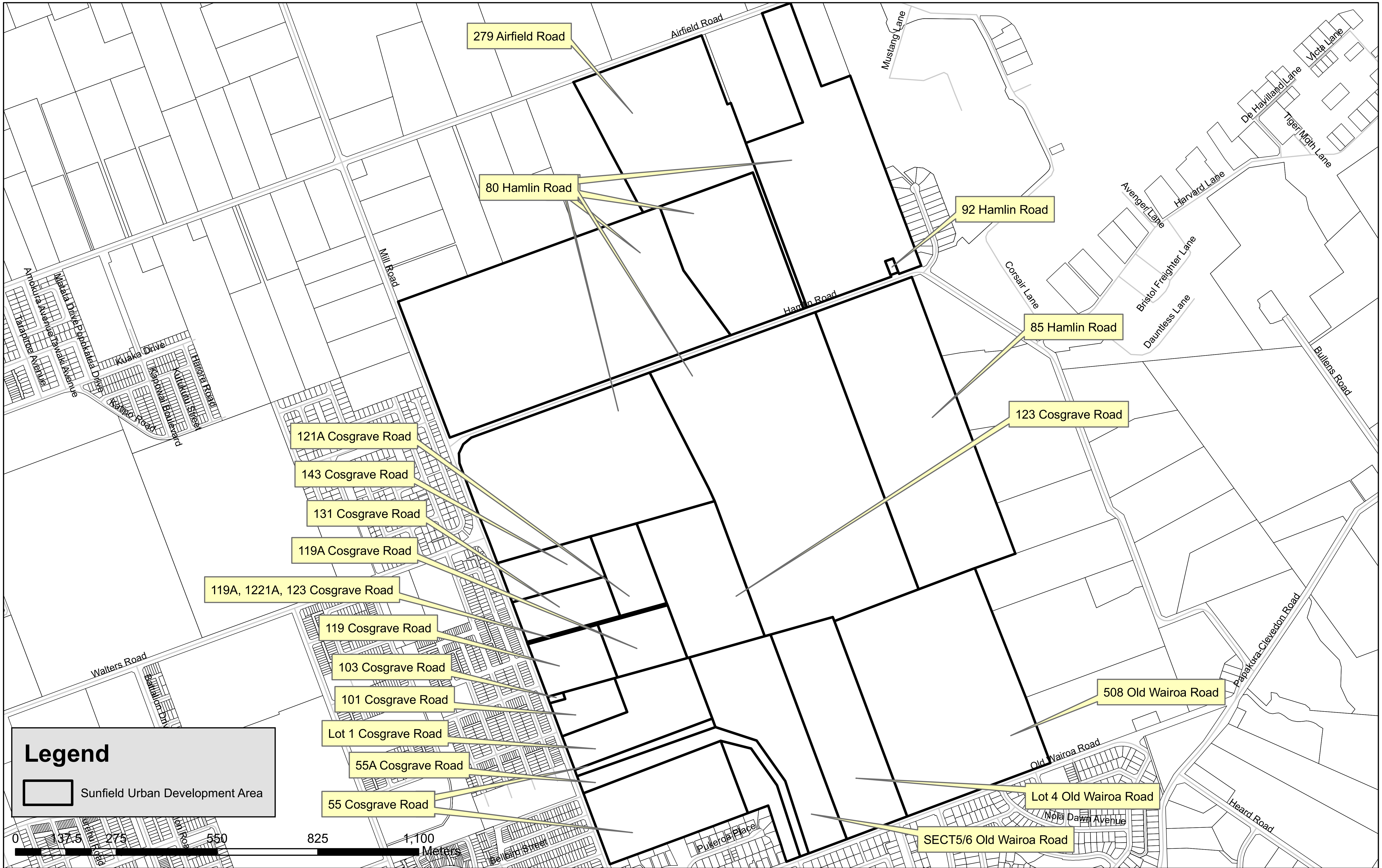
This report is certified by David O'Reilly, Suitability Qualified and Experienced Practitioner (SQEP):



Principal Environmental Consultant
Focus Environmental Services Limited

Attachments

Figure 1 – Site Location Plan
Human Health and Environmental Protection Criterion (NES: CS)
The PSI's and DSI's listed on Page 1


279 Airfield Road
80 Hamlin Road
92 Hamlin Road
85 Hamlin Road
123 Cosgrave Road
121A Cosgrave Road
143 Cosgrave Road
131 Cosgrave Road
119A Cosgrave Road
119A, 1221A, 123 Cosgrave Road
119 Cosgrave Road
103 Cosgrave Road
101 Cosgrave Road
Lot 1 Cosgrave Road
55A Cosgrave Road
55 Cosgrave Road
508 Old Wairoa Road
Lot 4 Old Wairoa Road
SECT5/6 Old Wairoa Road
Airfield Road
Hamlin Road
Mill Road
Walters Road
Old Wairoa Road
Papakura-Clevedon Road
Bullens Road
Heard Road
Legend
Sunfield Urban Development Area
0 137.5 275 550 825 1,100
Meters

Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542 Ph: +64 9 579 4155 www.focusenvironmental.co.nz	**Winton Land Limited** Sunfield Urban Development Area Papakura Auckland	**Figure 1: Site Location Plan** Cover Letter	1804.002	Drawing Number: 1804.001.01 Drawn By: MT Checked By: DO'R Date: 13/12/2023

	Parameter	NES: CS					AUP: OP
		Rural Residential (25% Produce)	Residential (10% Produce)	High Density Residential	Recreational	Commercial/ Industrial	
		(mg/kg, unless otherwise stated)					
Metals	Arsenic	17	20	45	80	70	100
	Boron	NL	NL	NL	NL	NL	-
	Cadmium	0.8	3	230	400	1,300	7.5
	Chromium	290	460	1,500	2,700	6,300	400
	Copper	NL	NL	NL	NL	NL	325
	Lead	160	210	500	880	3,300	250
	Mercury	200	310	1,000	1,800	4,200	0.75
	Nickel	400 [1]	400 [1]	1,200 [6]	1,200 [8]	6,000 [11]	105
	Zinc	7,400 [1]	7,400 [1]	60,000 [6]	30,000 [8]	400,000 [11]	400
OCPs	Total DDT	45	70	240	400	1,000	12
	Dieldrin [17]	1.1	2.6	45	70	160	0.5 [14]
PAHs	BaP Eq. (Zero)	6	10	24	40	35	20
TPH*	(C7 - C9)	2,700 [2]	2,700 [2]	2,700 [2]	8,800 [9]	8,800 [12]	710 [15]
	(C10 - C14)	560 [2]	560 [2]	560 [2]	1,900 [9]	1,900 [12]	1,500 [15]
	(C15 - C36)	NA [2]	NA [2]	NA [2]	NA [9]	NA [12]	NA [15]
BTEX	Benzene	1.7 [2]	1.7 [2]	1.7 [2]	7.2 [9]	7.2 [12]	0.0057 [15]
	Toluene	210 [2]	210 [2]	210 [2]	670 [9]	670 [12]	1.1 [15]
	Ethylbenzene	110 [2]	110 [2]	110 [2]	350 [9]	350 [12]	1.2 [15]
	Xylenes	160 [2]	160 [2]	160 [2]	510 [9]	510 [12]	0.67 [15]
Other	Cyanide	0.9 [16]	0.9 [16]	0.9 [16]	0.9 [16]	8.0 [16]	0.9 [16]
Asbestos	AF/FA	0.001% [3]/0.01% [4]	0.001% [3]/0.01% [4]	0.001% [3]/0.04% [7]	0.001% [3]/0.02% [10]	0.001% [3]/0.05% [13]	-
	Visual ACM	No Visual Evidence [5]	No Visual Evidence [5]	No Visual Evidence [5]	No Visual Evidence [5]	No Visual Evidence [5]	-

Notes	Description
*	If soil type is not silty clay, or contamination extends beyond 1m depth then refer to guideline document - Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand – Tier 1 Soil Acceptance Criteria, Module 4, August 1999
NL	No Limit
1	No Soil Contaminant Standards for health (SCSs $_{(health)}$) given, guideline values derived in accordance with the Contaminated Land Management Guidelines number 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), and taken from the National Environment Protection (Assessment of Site Contamination) Measure 1999 for Low Density Residential land use
2	Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand – Tier 1 Soil Acceptance Criteria, Module 4, August 1999 for Residential land use (silty clay) all pathways with contamination at the surface (<1.0m)
3	Soil guideline values for asbestos in Soil of 0.001% combined fibrous asbestos and asbestos fines (FA/AF), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017)
4	Soil guideline values for asbestos in Soil of 0.01% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017)
5	No visual evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017)
6	No Soil Contaminant Standards for health (SCSs $_{(health)}$) given, guideline values derived in accordance with the Contaminated Land Management Guidelines number 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), and taken from the National Environment Protection (Assessment of Site Contamination) Measure 1999 for High Density Residential land use
7	Soil guideline values for asbestos in Soil of 0.04% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017)
8	No Soil Contaminant Standards for health (SCSs $_{(health)}$) given, guideline values derived in accordance with the Contaminated Land Management Guidelines number 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), and taken from the National Environment Protection (Assessment of Site Contamination) Measure 1999 for Recreational land use
9	Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand – Tier 1 Soil Acceptance Criteria, Module 4, August 1999 for Recreational land use (silty clay) all pathways with contamination at the surface (<1.0m)
10	Soil guideline values for asbestos in Soil of 0.02% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017)
11	No Soil Contaminant Standards for health (SCSs $_{(health)}$) given, guideline values derived in accordance with the Contaminated Land Management Guidelines number 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), and taken from the National Environment Protection (Assessment of Site Contamination) Measure 1999 for Commercial/Industrial land use
12	Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand – Tier 1 Soil Acceptance Criteria, Module 4, August 1999 for Commercial/Industrial land use (silty clay) all pathways with contamination at the surface (<1.0m)
13	Soil guideline values for asbestos in Soil of 0.05% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017)
14	Soil Guideline Values to protect on-site ecological receptors taken from Ministry for the Environment Guidelines for Identifying, Investigating and Managing Risks Associated with Former Sheep-dip Sites, November 2006
15	Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand – Tier 1 Soil Acceptance Criteria, Module 4, August 1999 for the Protection of Groundwater Quality for silty clay soils with contamination at the surface (<1.0m) with shallow groundwater
16	Free Cyanide - Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Canadian Council of Ministers of the Environment, 1997
17	The Soil Contaminant Standard is applicable to either Dieldrin or Aldrin Separately, or to the sum of Aldrin and Dieldrin if both are involved.

DETAILED SITE INVESTIGATION
55 COSGRAVE ROAD &
55A COSGRAVE ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.008 December 2023 (R4)

Company Information

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Quality Information

Project Name	Detailed Site Investigation 55 Cosgrave Road & 55A Cosgrave Road, Ardmore
Project Number	1443.008 (R5)
File Reference	M:\2023 Jobs\Winton\Sunfield Development\Completed Reports\55 Cosgrave Road\R5\1443.008_DSI_MT_R5.docx
Date Issued	April 2021
Date Revised	December 2023

Author

Megan Thomas
Environmental Scientist

Reviewed

Claire Johnson
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Authorised

David O'Reilly
Principal Environmental Consultant

Distribution List

Parties	Copies
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Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation (DSI) at 55 & 55A Cosgrave Road, Ardmore, Auckland. The legal description of the site is Sect 3 SO 495342, Sect 4 SO 495342 & SECT 1 SO 495342, SECT 2 SO495342 with an area of 9.24 and 1.81 ha respectively.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the properties of 55 Cosgrave Road and the western portion of 55A Cosgrave Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, 55 Cosgrave, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, three discrete surface soil samples were taken from the areas of the historical buildings identified at the site, and twenty discrete samples were composited (4:1) at the laboratory to form 5 composite samples from the area where organo-chlorine pesticide sprays were potentially used.

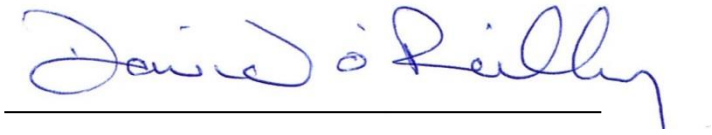
The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Submitted By,



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client*
- *The report titled 'Preliminary Site Investigation, Ardmore Block Plan Change Area, 55 Cosgrave Road, Ardmore Auckland' dated December 2020 and prepared by Focus Environmental Services;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

2.0 Site Identification

The property is located at 55 Cosgrave Road and the western area of 55A Cosgrave Road, Ardmore, Auckland as shown in Figure 1 attached. The legal description of the site is Sect 3 SO 495342, Sect 4 SO 495342 & SECT 1 SO 495342, SECT 2 SO495342 (henceforth referred to as the site) with an area of 9.24 and 1.81 ha respectively. The site is located at national grid reference 1774124mE and 5897887mN.

The site is rectangular in shape and is zoned 'Future Urban Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate the subject sites are typically underlain by alluvial deposits of the Puketoka Formation. A description of the underlying geology is presented in Table 1 below.

Table 1: Geology: 55 & 55A Cosgrave Road, Ardmore

Key name	Late Pliocene to Middle Pleistocene pumiceous river deposits
Simple name	Neogene sedimentary rocks
Main rock name	Sand
Description	Pumiceous mud, sand and gravel with muddy peat and lignite: rhyolite pumice, including non-welded ignimbrite, tephra and alluvia
Subsidiary rocks	Mud gravel peat lignite tephra pumice
Key group	Late Pliocene to Middle Pleistocene sediments
Stratigraphic lexicon name	Puketoka Formation
Absolute age (min)	0.071 million years
Absolute age (max)	3.6 million years
Rock group	Sandstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled '*Cosgrave Road Plan Change: Baseline Ecology*' and dated April 2023, is an artificial drainage channel which runs through the western boundary of the site.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is attached as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, 55 Cosgrave Road, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site buildings, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

This document is intended to confirm the contamination status of the site at 55 Cosgrave Road, Ardmore.

In addition, at the time of writing this report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Potentially Contaminating Activities or Land Uses

Three potentially contaminating activities were identified at the site, these are outlined in Table 2 below.

Table 2: Potentially Contaminating Activities and/or Land Uses: 55 & 55A Cosgrave Road, Ardmore

Activity Description	HAIL Category
Historical Horticulture/Persistent Pesticide Use	A10
Maintenance and Use of Lead Based Paint	I
Demolition of Historic Structures Potentially Containing Asbestos, Products Potentially Containing Asbestos in a Degraded Condition, and Potentially Asbestos Containing Material intermixed with the Site Soils	E1

It should be noted that following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation. In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site

8.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 3 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 3: Preliminary Conceptual Site Model: 55 & 55A Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, Revised 2021).

Twenty discrete soil samples were collected from across the site and composited at the laboratory (4:1) to form five composite samples which are indicative and representative of the areas of the site potentially subject to historical horticultural and organo-chlorine pesticide spray use onsite.

Furthermore, three discrete surface soil samples were collected from the area of the historical buildings on site. All samples were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 4 below.

Table 4: Sample Analysis Information: 55 & 55A Cosgrave Road, Ardmore

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
COMP01 - COMP05	0 - 0.15m	5	Historical Horticulture/Pesticide Use	• Total recoverable Arsenic, Copper & Lead; and • Organo-chlorine Pesticides.
HB01 – HB03	0 - 0.15m	3	Potential ACM Demolition Debris	• Semi-quantitative Asbestos in Soil (NZ Guidelines).
			Application of Lead Based Paint	• Total recoverable Lead.

It should be noted that no visual evidence of asbestos containing materials was observed within the vicinity of the historical building.

The sample location plan is presented as Figure 2.

10.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars or laboratory supplied 500ml plastic containers and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

11.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICPMS. In accordance with in-house procedure based on US EPA method 200.8.
- Organo-chlorine Pesticides – sonication extraction – OCP Screen method, air dry, grind, sonication extraction GC-ECD.
- Semi–quantitative Asbestos in Soil - Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with AS4964-2004 Method for the qualitative identification of asbestos in soil samples.

12.0 Basis for Guideline Values

It is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

In addition, as the NES does not contain a reference value for asbestos in soil, in accordance with the hierarchy described in the Contaminated Land Management Guidelines No. 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), the soil guideline value for asbestos in New Zealand for residential land use, taken from the New Zealand Guidelines for Assessing and Manging Asbestos in Soil (BRANZ Limited, 2017) of 0.001% combined fibrous asbestos and asbestos fines (FA/AF) and/or 0.01% asbestos containing material (ACM) has been adopted as the site assessment criteria.

Furthermore, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153).

The relevant values of the above guidelines have been reproduced in Table 5 below:

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

Table 5: Site Assessment Criteria: 55 Cosgrave Road, Ardmore (mg/kg)

Parameter	NES ($SCSs_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Copper	NL	325	45
Lead	210	250	65
Total DDT	70	12	-
Dieldrin	2.6	-	-
Asbestos (AF/FA)	0.001%[1]/0.01%[2]	-	-
Visual ACM	No Visual Evidence of ACM[3]	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg; 1 = Soil guideline values for asbestos in Soil of 0.001% combined fibrous asbestos and asbestos fines (FA/AF), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 2 = Soil guideline values for asbestos in Soil of 0.01% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 3 = No visual evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017).

It is considered that the natural background levels of organo-chlorine pesticides and asbestos in soils are to be below the analytical levels of detection and hence the detection of asbestos in any form (visual evidence, AF & FA) would restrict material from being classified as cleanfill.

13.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 6 - 8 below and laboratory transcripts are provided in Appendix C.

13.1 Heavy Metals

Table 6: Heavy Metals Results: 55 Cosgrave Road, Ardmore (mg/kg)

Sample	As	Cu	Pb
COMP01	<8	26	17.7
COMP02	4	29	18.8
COMP03	3	31	18.6
COMP04	<5	25	17
COMP05	7	23	22
HB01	-	-	25
HB02	-	-	16.8
HB03	-	-	20

Note: Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic, copper and lead detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils and therefore below the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP.

13.2 Organo-chlorine Pesticides

Table 7: Organo-chlorine Pesticide Results: 55 Cosgrave Road, Ardmore (mg/kg)

Sample	Total DDT	Dieldrin
COMP01	<0.02	<0.05
COMP02	<0.02	<0.05
COMP03	<0.02	<0.05
COMP04	<0.02	<0.05
COMP05	<0.02	<0.05

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the analytical levels of detection, therefore below the cleanfill criteria, the $SCS_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

13.3 Asbestos

Table 8: Asbestos in Soil Results: 55 Cosgrave Road, Ardmore (Semi-quantitative, %)

Sample	Asbestos Type	Asbestos (FA/AF %)	Asbestos (% ACM)
HB01	Asbestos Not Detected	<0.001	<0.001
HB02	Asbestos Not Detected	<0.001	<0.001
HB03	Asbestos Not Detected	<0.001	<0.001

Note: * - denotes residual concentrations detected. Results in red exceed the adopted human health criteria. Results in *Italics* exceed the cleanfill criteria.

The concentration of asbestos fibres detected in the all samples collected were below the analytical levels of detection, therefore below the cleanfill criteria, and the adopted human health criteria.

14.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 9 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 9: Revised Conceptual Site Model: 55 Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP

15.0 Regulatory Requirements

15.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore likely be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity will unlikely comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

15.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

As there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

16.0 Conclusions and Recommendations

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, 55 Cosgrave, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, three discrete surface soil samples were taken from the areas of the historical buildings identified at the site, and twenty discrete samples were composited (4:1) at the laboratory to form 5 composite samples from the area where organo-chlorine pesticide sprays were potentially used.
The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

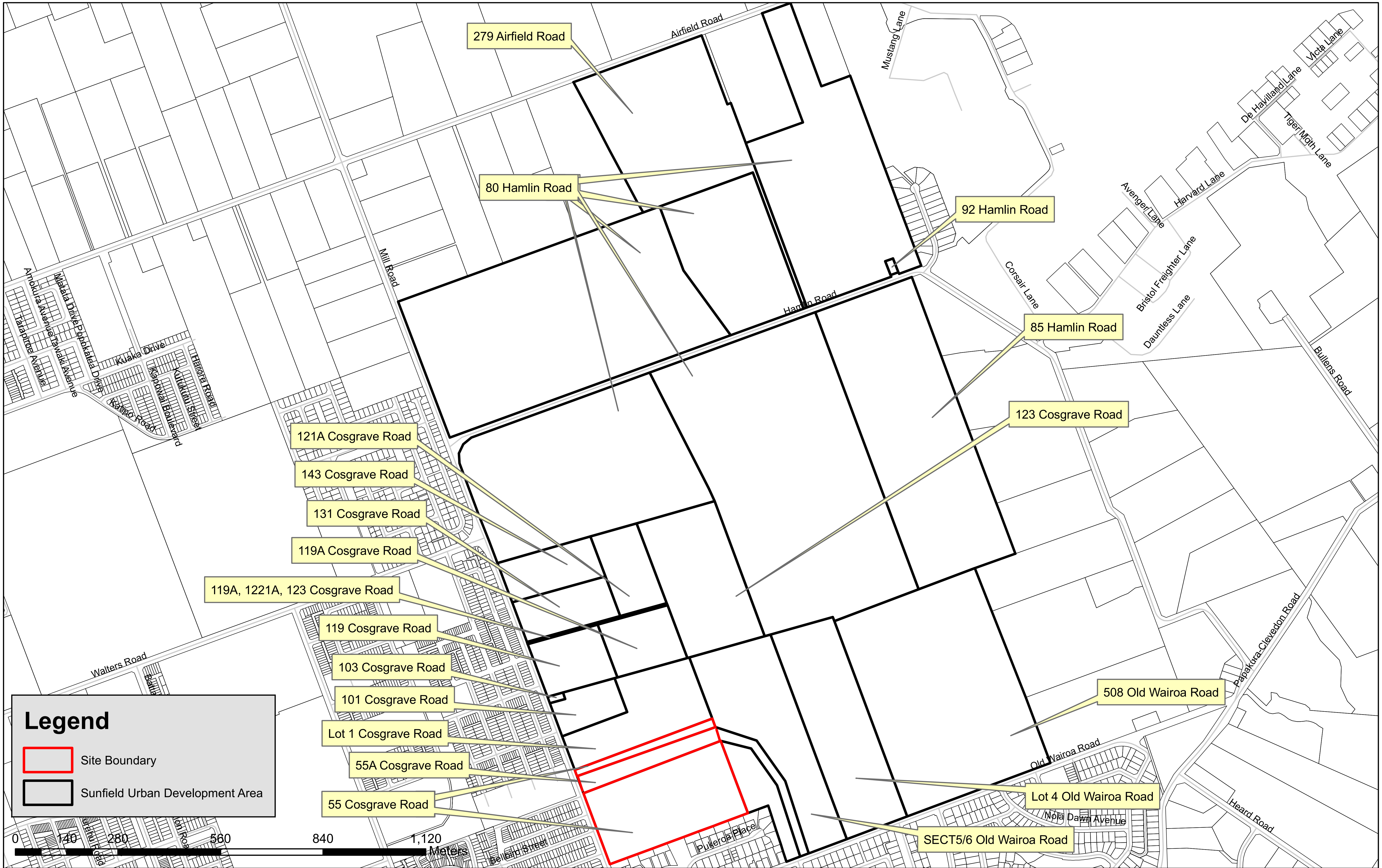
As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Figures

Figure 1 –Site Location Plan

Figure 2 – Sample Location Plan



279 Airfield Road
80 Hamlin Road
92 Hamlin Road
85 Hamlin Road
123 Cosgrave Road
121A Cosgrave Road
143 Cosgrave Road
131 Cosgrave Road
119A Cosgrave Road
119A, 1221A, 123 Cosgrave Road
119 Cosgrave Road
103 Cosgrave Road
101 Cosgrave Road
Lot 1 Cosgrave Road
55A Cosgrave Road
55 Cosgrave Road
508 Old Wairoa Road
Lot 4 Old Wairoa Road
SECT5/6 Old Wairoa Road
Airfield Road
Hamlin Road
Mill Road
Walters Road
Old Wairoa Road
Papakura-Clevedon Road
Bullens Road
Heard Road
Nola Dawn Avenue
Pukeroa Place
Belfairs Street
Mustang Lane
Victa Lane
De Havilland Lane
Tiger Moth Lane
Harvard Lane
Avenger Lane
Bristol Freighter Lane
Corsair Lane
Dauntless Lane
Kuaka Drive
Legend
Site Boundary
Sunfield Urban Development Area
0 140 280 560 840 1,120
Meters

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Winton Land Limited
55 & 55A Cosgrave Road
Sunfield Urban Development Area
Papakura
Auckland

Figure 1: Site Location Plan
Detailed Site Investigation

1443.008

Drawing Number: 1443.008.01
Drawn By: MT
Checked By: DO'R
Date: 19/12/2023

Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542 Ph: +64 9 579 4155 www.focusenvironmental.co.nz	**Winton Land Limited** 55 & 55A Cosgrave Road Sunfield Urban Development Area Papakura Auckland	**Figure 2: Sample Location Plan** Detailed Site Investigation	1443.008 R5	Drawing Number: 1443.008.02 Drawn By: MT Checked By: DO'R Date: 19/12/2023

Appendices

Appendix A – Illustrative Masterplan

Appendix B – Environmental HAIL

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

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

Appendix C – Laboratory Transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2566816 SPv2
Contact:	Elliot Dillon-Herzog	**Date Received:**	25-Mar-2021
	C/- Focus Environmental Services Limited	**Date Reported:**	30-Mar-2021
	PO Box 11455	**Quote No:**	80876
	Ellerslie	**Order No:**	
	Auckland 1542	**Client Reference:**	1443.008
		Submitted By:	Elliot Dillon-Herzog

Sample Type: Soil

Sample Name:		HB01 24-Mar-2021	HB02 24-Mar-2021	HB03 24-Mar-2021	Composite of COMP01 A, COMP01 B, COMP01 C and COMP01 D	Composite of COMP02 A, COMP02 B, COMP02 C and COMP02 D
Lab Number:		2566816.21	2566816.22	2566816.23	2566816.24	2566816.25
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	71	72
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	< 8	4
Total Recoverable Copper	mg/kg dry wt	-	-	-	26	29
Total Recoverable Lead	mg/kg dry wt	25	16.8	20	17.7	18.8
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	< 0.015	< 0.014
alpha-BHC	mg/kg dry wt	-	-	-	< 0.015	< 0.014
beta-BHC	mg/kg dry wt	-	-	-	< 0.015	< 0.014
delta-BHC	mg/kg dry wt	-	-	-	< 0.015	< 0.014
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.015	< 0.014
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.015	< 0.014
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.015	< 0.014
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.015	< 0.014
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.015	< 0.014
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.015	< 0.014
4,4'-DDE	mg/kg dry wt	-	-	-	< 0.015	< 0.014
2,4'-DDT	mg/kg dry wt	-	-	-	< 0.015	< 0.014
4,4'-DDT	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Total DDT Isomers	mg/kg dry wt	-	-	-	< 0.09	< 0.09
Dieldrin	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Endosulfan I	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Endosulfan II	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Endrin	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Endrin ketone	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Heptachlor	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.015	< 0.014
Methoxychlor	mg/kg dry wt	-	-	-	< 0.015	< 0.014

Sample Type: Soil						
Sample Name:		Composite of COMP03 A, COMP03 B, COMP03 C and COMP03 D	Composite of COMP04 A, COMP04 B, COMP04 C and COMP04 D	Composite of COMP05 A, COMP05 B, COMP05 C and COMP05 D		
Lab Number:		2566816.26	2566816.27	2566816.28		
Individual Tests						
Dry Matter	g/100g as rcvd	71	69	71	-	-
Total Recoverable Arsenic	mg/kg dry wt	3	< 5	7	-	-
Total Recoverable Copper	mg/kg dry wt	31	25	23	-	-
Total Recoverable Lead	mg/kg dry wt	18.6	17.0	22	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
alpha-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
beta-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
delta-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
cis-Chlordane	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
trans-Chlordane	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
2,4'-DDD	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
4,4'-DDD	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
2,4'-DDE	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
4,4'-DDE	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
2,4'-DDT	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
4,4'-DDT	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Total DDT Isomers	mg/kg dry wt	< 0.09	< 0.09	< 0.09	-	-
Dieldrin	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Endosulfan I	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Endosulfan II	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Endrin	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Endrin aldehyde	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Endrin ketone	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Heptachlor	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.014	< 0.014	< 0.014	-	-
Methoxychlor	mg/kg dry wt	< 0.014	< 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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	21-28
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	21-28
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	24-28
Dry Matter (Env)	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	24-28
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	21-28
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	24-28
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	24-28

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	21-28

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

Testing was completed between 29-Mar-2021 and 30-Mar-2021. 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.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

Hill Laboratories
TRIED, TESTED AND TRUSTED

R J Hill Laboratories Limited
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Hornby
Christchurch 8042 New Zealand

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T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2567182	A2Pv1
Contact:	Elliot Dillon-Herzog	**Date Received:**	25-Mar-2021	
	C/- Focus Environmental Services Limited	**Date Reported:**	26-Mar-2021	
	PO Box 11455	**Quote No:**	80876	
	Ellerslie	**Order No:**		
	Auckland 1542	**Client Reference:**	1443.008	
		Submitted By:	Elliot Dillon-Herzog	

Sample Type: Soil

Sample Name:		HB01 24-Mar-2021	HB02 24-Mar-2021	HB03 24-Mar-2021		
Lab Number:		2567182.1	2567182.2	2567182.3		
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	-	-
Description of Asbestos Form		-	-	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	-	-
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	-	-
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	-	-
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	-	-
As Received Weight	g	322.2	361.5	297.8	-	-
Dry Weight	g	219.2	287.6	216.9	-	-
Moisture	%	32	20	27	-	-
Sample Fraction >10mm	g dry wt	10.7	< 0.1	0.2	-	-
Sample Fraction <10mm to >2mm	g dry wt	44.0	29.6	38.5	-	-
Sample Fraction <2mm	g dry wt	164.0	256.9	177.3	-	-
<2mm Subsample Weight	g dry wt	57.6	52.5	57.7	-	-
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	-	-
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	-	-
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	-	-

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
- Trace - Trace levels of asbestos, as defined by AS4964-2004.

For further details, please contact the Asbestos Team.

Please refer to the BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil.
https://www.branz.co.nz/asbestos

The following assumptions have been made:

1. Asbestos Fines in the <2mm fraction, after homogenisation, is evenly distributed throughout the fraction
2. The weight of asbestos in the sample is unaffected by the ashing process.

Results are representative of the sample provided to Hill Laboratories only.

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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

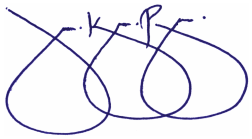
Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Wgt of Asbestos as Asbestos Fines in <10mm >2mm Fraction*	Measurement on analytical balance, from the <10mm >2mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.00001 g dry wt	1-3
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-3
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-3
Moisture	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-3
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1-3
Sample Fraction <10mm to >2mm	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1-3
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g dry wt	1-3
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-3
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-3
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3

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

Testing was completed on 26-Mar-2021. 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.



John Keneth Paglingayen
Bachelor of Applied Science
Laboratory Technician - Asbestos

DETAILED SITE INVESTIGATION
SECT 5 SO 495342, SECT 6 SO 495342
OLD WAIROA ROAD &
55A COSGRAVE ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.013 December 2023 (R5)

Company Information

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Quality Information

Project Name	Detailed Site Investigation Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore
Project Number	1443.013 (R5)
File Reference	M:\2023 Jobs\Winton\Sunfield Development\Completed Reports\Sect 5 Old Wairoa Road\R5\1443.013_DSI_MT (R5).docx
Date Issued	April 2021
Date Revised	December 2023

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Environmental Scientist

Authorised

David O'Reilly
Principal Environmental Consultant

Distribution List

Parties	Copies
Winton Land Limited	1
Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation (DSI) at Sect 5 SO 495342, Sect 6 SO 495342 Old Wairoa Road and the eastern portion of 55A Cosgrave Road, Ardmore, Auckland. The legal description of the sites are Sect 5 SO 495342, Sect 6 SO 495342 & SECT 1 SO 495342, SECT 2 SO495342 with an area of 11.81 and 1.13 ha respectively.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the properties of Sect 5 SO 495342, Sect 6 SO 495342 Old Wairoa Road and the eastern portion of 55A Cosgrave Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, a single discrete surface soil sample was taken from the area of the historical building identified at the site, and twenty discrete samples were composited at the laboratory (4:1) to form 5 composite samples from the area where organo-chlorine pesticide sprays were potentially used.

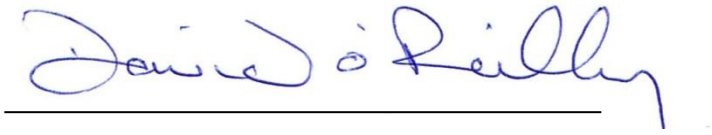
The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Submitted By,



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client*
- *The report titled 'Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore Auckland' dated December 2020 and prepared by Focus Environmental Services;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

2.0 Site Identification

The property is located at Sect 5 SO 495342, Sect 6 SO 495342 Old Wairoa Road and the eastern area of 55A Cosgrave Road, Ardmore, Auckland as shown in Figure 1 attached. The legal description of the sites are Sect 5 SO 495342, Sect 6 SO 495342 & SECT 1 SO 495342, SECT 2 SO495342 (henceforth referred to as the site) with an area of 11.81 and 1.13 ha respectively. The site is located at national grid reference 1774320mE and 5898108mN.

The site is rectangular in shape and is zoned 'Future Urban Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate the subject sites are typically underlain by alluvial deposits of the Tauranga Group Formation. A description of the underlying geologies is presented in Table 1 below.

Table 1: Geology: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	Mud
Description	Sand, silt mud and clay with local gravel and peat beds
Subsidiary rocks	Sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	Mudstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled '*Cosgrave Road Plan Change: Baseline Ecology*' and dated April 2023, is an artificial drainage channel which runs through the western boundary of the site.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is attached as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

This document is intended to confirm the contamination status of the site at Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore.

In addition, at the time of writing this report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Potentially Contaminating Activities or Land Uses

Three potentially contaminating activities were identified at the site, these are outlined in Table 2 below.

Table 2: Potentially Contaminating Activities: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore

Activity Description	HAIL Category
Historical Horticulture/Persistent Pesticide Use	A10
Maintenance and Use of Lead Based Paint	I
Demolition of Historic Structures Potentially Containing Asbestos, Products Potentially Containing Asbestos in a Degraded Condition, and Potentially Asbestos Containing Material intermixed with the Site Soils	E1

It should be noted that following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation. In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site

8.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 3 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 3: Preliminary Conceptual Site Model: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, Revised 2021).

Twenty discrete soil samples were collected from across the site and composited at the laboratory (4:1) to form five composite samples which are indicative and representative of the areas of the site potentially subject to historical horticultural, organo-chlorine pesticide spray use onsite.

Furthermore, one discrete surface soil sample was collected from the area of the historical building on site. All samples were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 4 below.

Table 4: Sample Analysis Information: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
COMP01 - COMP05	0 - 0.15m	5	Historical Horticulture/Pesticide Use	• Total recoverable Arsenic, Copper & Lead; and • Organo-chlorine Pesticides
HB01	0 - 0.15m	1	Potential ACM Demolition Debris	• Semi-quantitative Asbestos in Soil (NZ Guidelines).
			Application of Lead Based Paint	• Total recoverable Lead

It should be noted that no visual evidence of asbestos containing materials was observed within the vicinity of the historical building.

The sample location plan is presented as Figure 2.

10.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars or laboratory supplied 500ml plastic containers and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

11.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICPMS. In accordance with in-house procedure based on US EPA method 200.8.
- Organo-chlorine Pesticides – sonication extraction – OCP Screen method, air dry, grind, sonication extraction GC-ECD.
- Semi–quantitative Asbestos in Soil - Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with AS4964-2004 Method for the qualitative identification of asbestos in soil samples.

12.0 Basis for Guideline Values

Following the plan change it is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

In addition, as the NES does not contain a reference value for asbestos in soil, in accordance with the hierarchy described in the Contaminated Land Management Guidelines No. 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), the soil guideline value for asbestos in New Zealand for residential land use, taken from the New Zealand Guidelines for Assessing and Manging Asbestos in Soil (BRANZ Limited, 2017) of 0.001% combined fibrous asbestos and asbestos fines (FA/AF) and/or 0.01% asbestos containing material (ACM) has been adopted as the site assessment criteria.

Furthermore, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153).

The relevant values of the above guidelines have been reproduced in Table 5 below:

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

Table 5: Site Assessment Criteria: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (mg/kg)

Parameter	NES ($SCS_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Copper	NL	325	45
Lead	210	250	65
Total DDT	70	12	-
Dieldrin	2.6	-	-
Asbestos (AF/FA)	0.001%[1]/0.01%[2]	-	-
Visual ACM	No Visual Evidence of ACM[3]	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg; 1 = Soil guideline values for asbestos in Soil of 0.001% combined fibrous asbestos and asbestos fines (FA/AF), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 2 = Soil guideline values for asbestos in Soil of 0.01% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 3 = No visual evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017).

It is considered that the natural background levels of organo-chlorine pesticides and asbestos in soils are below the analytical levels of detection, and hence the detection of these analytes would restrict material from being classified as cleanfill.

13.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 6 - 8 below and laboratory transcripts are provided in Appendix C.

13.1 Heavy Metals

Table 6: Heavy Metals Results: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (mg/kg).

Sample	As	Cu	Pb
COMP01	3	27	19.8
COMP02	3	21	16.2
COMP03	3	24	17.4
COMP04	6	28	46
COMP05	<4	20	20
HB01	-	-	29

Note: Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic, copper and lead detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils and therefore below the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP.

13.2 Organo-chlorine Pesticides

Table 7: Organo-chlorine Pesticide Results: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
COMP01	<0.02	<0.05
COMP02	<0.02	<0.05
COMP03	<0.02	<0.05
COMP04	<0.02	<0.05
COMP05	<0.02	<0.05

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the analytical levels of detection, therefore below the cleanfill criteria, the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

13.3 Asbestos

Table 8: Asbestos in Soil Results: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road, Ardmore (Semi-quantitative, %)

Sample	Asbestos Type	Asbestos (FA/AF %)	Asbestos (% ACM)
HB01	Asbestos Not Detected	<0.001	<0.001

Note: * - denotes residual concentrations detected. Results in red exceed the adopted human health criteria. Results in *Italics* exceed the cleanfill criteria.

The concentration of asbestos fibres detected in the single sample collected was below the analytical levels of detection, therefore below the cleanfill criteria, and the adopted human health criteria.

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

14.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 9 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 9: Revised Conceptual Site Model: Sect 5 SO 495342, Sect 6 SO 495342, Old Wairoa Road & 55A Cosgrave Road, Ardmore.

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP

15.0 Regulatory Requirements

15.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore likely be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity will unlikely comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

15.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

As there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

16.0 Conclusions and Recommendations

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, SECT 5 SO, 495342, SECT SO, 49534, Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the former site building, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, the site contamination enquiry stated that the site had potentially been used for horticultural purposes. An interview with the property owner stated this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, a single discrete surface soil sample was taken from the area of the historical building identified at the site, and twenty discrete samples were composited at the laboratory (4:1) to form 5 composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

At the request of the client, 55A Cosgrave Road has been included in the report. Given the site is in use for the same purposes as the neighbouring sites on which the sample analysis was carried out it is reasonable to assume the concentrations of contaminants would also be below the maximum Auckland background concentrations for non-volcanic soils.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Figures

Appendices

Appendix A – Illustrative Masterplan

Appendix B – Environmental HAIL

Appendix C – Laboratory Transcripts

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

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

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Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2566801 SPv2
Contact:	Elliot Dillon-Herzog C/- Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542	**Date Received:**	25-Mar-2021
		Date Reported:	30-Mar-2021
		Quote No:	80876
		Order No:	
		Client Reference:	1443.013
		Submitted By:	Elliot Dillon-Herzog

Sample Type: Soil

Sample Name:		HB01 24-Mar-2021	Composite of COMP01 A, COMP01 B, COMP01 C & COMP01 D	Composite of COMP02 A, COMP02 B, COMP02 C & COMP02 D	Composite of COMP03 A, COMP03 B, COMP03 C & COMP03 D	Composite of COMP04 A, COMP04 B, COMP04 C & COMP04 D
Lab Number:		2566801.21	2566801.22	2566801.23	2566801.24	2566801.25
Individual Tests						
Dry Matter	g/100g as rcvd	-	68	59	60	58
Total Recoverable Arsenic	mg/kg dry wt	-	3	3	3	6
Total Recoverable Copper	mg/kg dry wt	-	27	21	24	28
Total Recoverable Lead	mg/kg dry wt	29	19.8	16.2	17.4	46
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
alpha-BHC	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
beta-BHC	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
delta-BHC	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
gamma-BHC (Lindane)	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
cis-Chlordane	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
trans-Chlordane	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
2,4'-DDD	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
4,4'-DDD	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
2,4'-DDE	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
4,4'-DDE	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
2,4'-DDT	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
4,4'-DDT	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Total DDT Isomers	mg/kg dry wt	-	< 0.09	< 0.11	< 0.10	< 0.11
Dieldrin	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endosulfan I	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endosulfan II	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endosulfan sulphate	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endrin	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endrin aldehyde	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Endrin ketone	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Heptachlor	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Heptachlor epoxide	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Hexachlorobenzene	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018
Methoxychlor	mg/kg dry wt	-	< 0.015	< 0.017	< 0.017	< 0.018

Sample Type: Soil						
Sample Name:		Composite of COMP05 A, COMP05 B, COMP05 C & COMP05 D				
Lab Number:		2566801.26				
Individual Tests						
Dry Matter	g/100g as rcvd	71	-	-	-	-
Total Recoverable Arsenic	mg/kg dry wt	< 4	-	-	-	-
Total Recoverable Copper	mg/kg dry wt	20	-	-	-	-
Total Recoverable Lead	mg/kg dry wt	20	-	-	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	-	-	-	-
alpha-BHC	mg/kg dry wt	< 0.014	-	-	-	-
beta-BHC	mg/kg dry wt	< 0.014	-	-	-	-
delta-BHC	mg/kg dry wt	< 0.014	-	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	-	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.014	-	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.014	-	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.014	-	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.014	-	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.014	-	-	-	-
4,4'-DDE	mg/kg dry wt	< 0.014	-	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.014	-	-	-	-
4,4'-DDT	mg/kg dry wt	< 0.014	-	-	-	-
Total DDT Isomers	mg/kg dry wt	< 0.09	-	-	-	-
Dieldrin	mg/kg dry wt	< 0.014	-	-	-	-
Endosulfan I	mg/kg dry wt	< 0.014	-	-	-	-
Endosulfan II	mg/kg dry wt	< 0.014	-	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.014	-	-	-	-
Endrin	mg/kg dry wt	< 0.014	-	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.014	-	-	-	-
Endrin ketone	mg/kg dry wt	< 0.014	-	-	-	-
Heptachlor	mg/kg dry wt	< 0.014	-	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.014	-	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.014	-	-	-	-
Methoxychlor	mg/kg dry wt	< 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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	21-26
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	21-26
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	22-26
Dry Matter (Env)	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	22-26
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	21-26
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	22-26
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	22-26

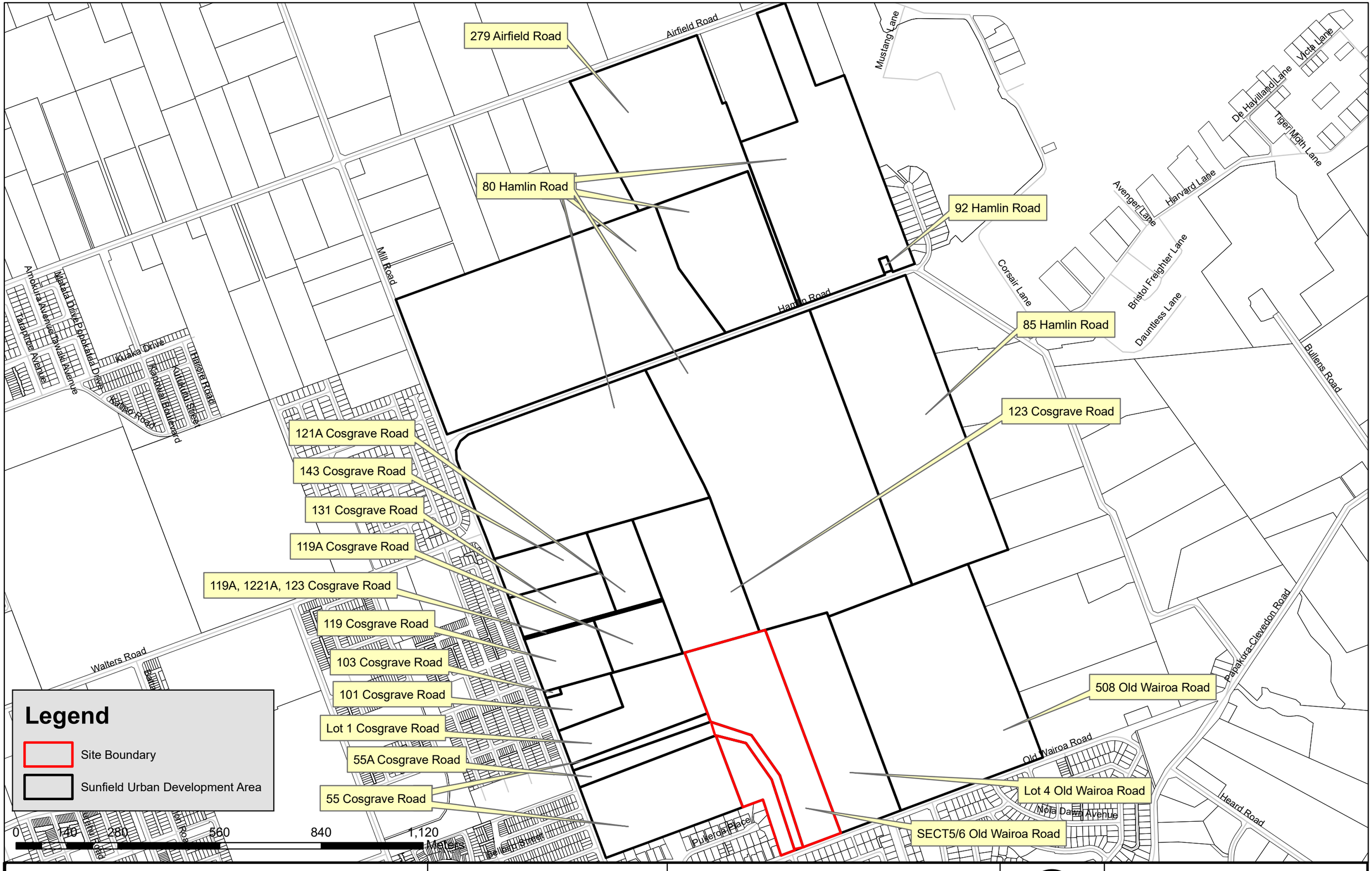
Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	21-26

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

Testing was completed between 26-Mar-2021 and 30-Mar-2021. 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.

Martin Cowell - BSc
Client Services Manager - Environmental



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Winton Land Limited

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Old Wairoa Road
Sunfield Urban Development Area
Papakura
Auckland

Figure 1: Site Location Plan

Detailed Site Investigation

1443.008 R5

Drawing Number: 1443.008.01
Drawn By: MT
Checked By: DO'R
Date: 19/12/2023

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Auckland

Figure 3: Sample Location Plan
Detailed Site Investigation

1443.013 R5

Drawing Number: 1443.013.02
Drawn By: MT
Checked By: DO'R
Date: 19/12/2023

DETAILED SITE INVESTIGATION
LOT 1 DP5548 COSGRAVE ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.011 December 2023 (R5)

Company Information

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Quality Information

Project Name	Detailed Site Investigation Lot 1 DP55480, Cosgrave Road, Ardmore
Project Number	1443.011 (R5)
File Reference	M:\2023 Jobs\Winton\Sunfield Development\Completed Reports\Lot 1 Cosgrave Road\R5\1443.011_DSI_MT (R5).docx
Date Issued	April 2021
Date Revised	December 2023

Author

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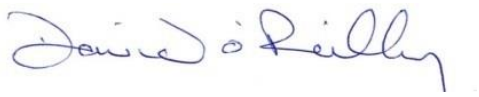
Environmental Scientist

Reviewed

Claire Johnson
Environmental Scientist

Authorised



David O'Reilly
Principal Environmental Consultant

Distribution List

Parties	Copies
Winton Land Limited	1
Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation (DSI) at Lot 1 DP 55480 Cosgrave Road, Ardmore, Auckland. The legal description of the site is Lot 1 DP 55480 with an area of 5.80 ha.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the property of Lot 1 DP 55480 Cosgrave Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP55480, Cosgrave Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

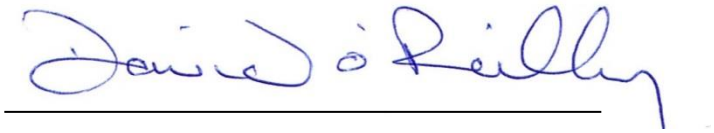
As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Submitted By,



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client;*
- *The report titled 'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP 55480, Cosgrave Road, Ardmore Auckland' dated December 2020 and prepared by Focus Environmental Services;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

2.0 Site Identification

The property is located at Lot 1 DP 55480 Cosgrave Road, Ardmore as shown in Figure 1 attached. The legal description of the site is Lot 1 DP 55480 with an area of 5.80 ha. The site is located at national grid reference 1774088mE and 5898124mN.

The site is irregular in shape and is zoned 'Future Urban Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate the subject sites are typically underlain by alluvial deposits of the Tauranga Group Formation. A description of the underlying geologies is presented in Table 1 below.

Table 1: Geology: Lot 1 DP 55480, Cosgrave Road, Ardmore

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	Mud
Description	Sand, silt mud and clay with local gravel and peat beds
Subsidiary rocks	Sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	Mudstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled *'Cosgrave Road Plan Change: Baseline Ecology'* and dated April 2023, is an artificial drainage channel which runs through the western boundary of the plan change area.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is attached as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP 55480, Cosgrave Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the HAIL was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

This document is intended to confirm the contamination status of the site at Lot 1 DP 55480, Old Wairoa Road, Ardmore.

In addition, at the time of writing this report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Potentially Contaminating Activities or Land Uses

Three potentially contaminating activities were identified at the site, these are outlined in Table 2 below.

Table 2: Potentially Contaminating Activities: Lot 1 DP 55480, Cosgrave Road, Ardmore

Activity Description	HAIL Category
Historical Horticulture/Persistent Pesticide Use	A10

It should be noted that following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation. In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

8.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 3 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 3: Preliminary Conceptual Site Model: Lot 1 DP 55480, Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, revised 2021).

Twelve discrete soil samples were collected from across the site and composited at the laboratory (4:1) to form three composite samples which are indicative and representative of the areas of the site potentially subject to historical horticultural, organo-chlorine pesticide spray use onsite. All samples were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 5 below.

Table 4: Sample Analysis Information: Lot 1 DP 55480, Cosgrave Road, Ardmore

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
COMP01-COMP03	0 - 0.15m	3	Historical Horticulture/Pesticide Use	• Total recoverable Arsenic, Copper & Lead; and • Organo-chlorine Pesticides

The sample location plan is presented as Figure 2.

10.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

11.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICPMS. In accordance with in-house procedure based on US EPA method 200.8.
- Organo-chlorine Pesticides – sonication extraction – OCP Screen method, air dry, grind, sonication extraction GC-ECD.

12.0 Basis for Guideline Values

Following the plan change it is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

Furthermore, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153).

The relevant values of the above guidelines have been reproduced in Table 5 below:

Table 5: Site Assessment Criteria: Lot 1 DP 55480, Cosgrave Road, Ardmore (mg/kg)

Parameter	NES ($SCSs_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Copper	NL	325	45
Lead	210	250	65
Total DDT	70	12	-
Dieldrin	2.6	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg;

It is considered that the natural background levels of organo-chlorine pesticides are below the analytical levels of detection, hence if analysis shows any concentrations above the limit of detection, this would restrict material from being classified as cleanfill.

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

13.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 6 & 7 below and laboratory transcripts are provided in Appendix A.

13.1 Heavy Metals

Table 6: Heavy Metals Results: Lot 1 DP 55480, Cosgrave Road, Ardmore (mg/kg).

Sample	As	Cu	Pb
COMP01	3	26	30
COMP02	<4	22	16.6
COMP03	<4	25	18.6

Note: Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic, copper and lead detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils and therefore below the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP.

13.2 Organo-chlorine Pesticides

Table 7: Organo-chlorine Pesticide Results: Lot 1 DP 55480, Cosgrave Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
COMP01	<0.09	<0.014
COMP02	<0.09	<0.015
COMP03	<0.09	<0.015

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the analytical levels of detection, therefore below the cleanfill criteria, the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

14.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 8 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 8: Revised Conceptual Site Model: Lot 1 DP 55480, Cosgrave Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP

15.0 Regulatory Requirements

15.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore likely be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity will unlikely comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

15.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

As there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

16.0 Conclusions and Recommendations

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 1 DP55480, Cosgrave Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

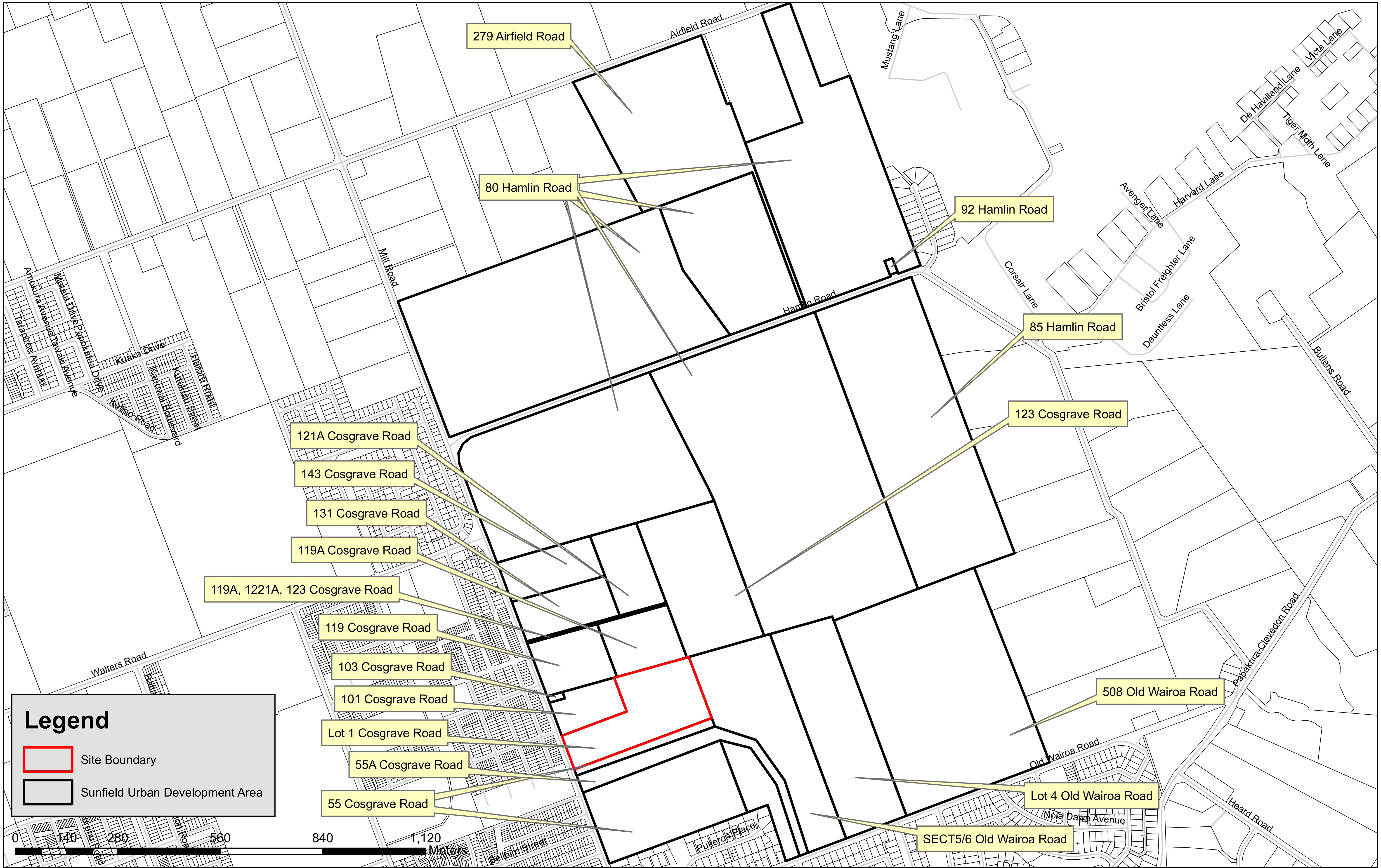
Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.
The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Figures


279 Airfield Road
80 Hamlin Road
92 Hamlin Road
85 Hamlin Road
123 Cosgrave Road
121A Cosgrave Road
143 Cosgrave Road
131 Cosgrave Road
119A Cosgrave Road
119A, 1221A, 123 Cosgrave Road
119 Cosgrave Road
103 Cosgrave Road
101 Cosgrave Road
Lot 1 Cosgrave Road
55A Cosgrave Road
55 Cosgrave Road
508 Old Wairoa Road
Lot 4 Old Wairoa Road
SECT5/6 Old Wairoa Road
Airfield Road
Mill Road
Hamlin Road
Walters Road
Old Wairoa Road
Papakura-Clevedon Road
Bullens Road
Heard Road
Mustang Lane
Corsair Lane
Avenger Lane
Harvard Lane
Bristol Freighter Lane
Dauntless Lane
De Havilland Lane
Tiger Moth Lane
Victa Lane
Kuaka Drive
Nola Dawn Avenue
Pukeroa Place
Belleair Street
Legend
Site Boundary
Sunfield Urban Development Area
0 140 280 560 840 1,120
Meters

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Winton Land Limited

Lot 1 DP55480 Cosgrave Road
Sunfield Urban Development Area
Papakura
Auckland

Figure 1: Site Location Plan

Detailed Site Investigation

1443.011 R5

Drawing Number: 1443.011.01

Drawn By: MT

Checked By: DO'R

Date: 19/12/2023

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Figure 2: Sample Location Plan

Detailed Site Investigation

1443.011 R5

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Drawn By: MT
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Appendices

Appendix A – Illustrative Masterplan

Appendix B – Environmental HAIL

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

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

Appendix C – Laboratory Transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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

Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2566804	SPv1
Contact:	Elliot Dillon-Herzog	**Date Received:**	25-Mar-2021	
	C/- Focus Environmental Services Limited	**Date Reported:**	30-Mar-2021	
	PO Box 11455	**Quote No:**	80876	
	Ellerslie	**Order No:**		
	Auckland 1542	**Client Reference:**	1443.011	
		Submitted By:	Elliot Dillon-Herzog	

Sample Type: Soil

Sample Name:		Composite of COMP01 A, COMP01 B, COMP01 C and COMP01 D	Composite of COMP02 A, COMP02 B, COMP02 C and COMP02 D	Composite of COMP03 A, COMP03 B, COMP03 C and COMP03 D		
Lab Number:		2566804.13	2566804.14	2566804.15		
Individual Tests						
Dry Matter	g/100g as rcvd	70	67	67	-	-
Total Recoverable Arsenic	mg/kg dry wt	3	< 4	< 4	-	-
Total Recoverable Copper	mg/kg dry wt	26	22	25	-	-
Total Recoverable Lead	mg/kg dry wt	30	16.6	18.6	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
alpha-BHC	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
beta-BHC	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
delta-BHC	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
cis-Chlordane	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
trans-Chlordane	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
2,4'-DDD	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
4,4'-DDD	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
2,4'-DDE	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
4,4'-DDE	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
2,4'-DDT	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
4,4'-DDT	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Total DDT Isomers	mg/kg dry wt	< 0.09	< 0.09	< 0.09	-	-
Dieldrin	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Endosulfan I	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Endosulfan II	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Endrin	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Endrin aldehyde	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Endrin ketone	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Heptachlor	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-
Methoxychlor	mg/kg dry wt	< 0.014	< 0.015	< 0.015	-	-

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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	13-15
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	13-15
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	13-15
Dry Matter (Env)	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	13-15
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	13-15
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	13-15

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

Testing was completed between 26-Mar-2021 and 30-Mar-2021. 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.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

DETAILED SITE INVESTIGATION
LOT 4 DP 55480
OLD WAIROA ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.012 December 2023 (R5)

Company Information

Focus Environmental Services Limited

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Ellerslie

Auckland 1542

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Email: mail@focusenvironmental.co.nz

Quality Information

Project Name	Detailed Site Investigation Lot 4 DP 55480, Old Wairoa Road, Ardmore
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Date Issued	April 2021
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Author

Megan Thomas
Environmental Scientist

Reviewed

Claire Johnson
Environmental Scientist

Authorised

David O'Reilly
Principal Environmental Consultant

Distribution List

Parties	Copies
Winton Land Limited	1
Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation (DSI) at Lot 4 DP 55480, Ardmore, Auckland. The legal description of the site is Lot 4 DP 55480 with an area of 10.35 ha.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the property of Lot 4 DP 55480 Old Wairoa Road, Ardmore and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

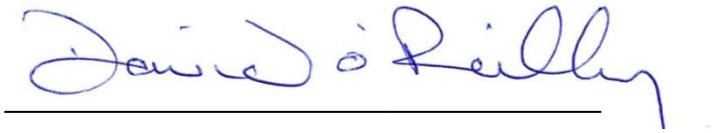
As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Submitted By,



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the Client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by the Client;*
- *The report titled 'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore Auckland' dated December 2020 and prepared by Focus Environmental Services;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the Client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the Client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the Client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018by SGS New Zealand.

2.0 Site Identification

The property is located at Lot 4 DP 55480 Old Wairoa Road, Ardmore as shown in Figure 1 attached. The legal description of the site is Lot 4 DP 55480 with an area of 10.35 ha. The site is located at national grid reference 1774602mE and 5898062mN.

The site is rectangular in shape and is zoned 'Future Urban Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate the subject sites are typically underlain by alluvial deposits of the Tauranga Group Formation. A description of the underlying geologies is presented in Table 1 below.

Table 1: Geology: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	Mud
Description	Sand, silt mud and clay with local gravel and peat beds
Subsidiary rocks	Sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	Mudstone
Rock class	Clastic sediment

No groundwater investigation was carried out as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled '*Cosgrave Road Plan Change: Baseline Ecology*' and dated April 2023, is an artificial drainage channel which runs through the western boundary of the plan change area.

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is presented as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the HAIL was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation.

This document is intended to confirm the contamination status of the site at Lot 4 DP 55480, Old Wairoa Road, Ardmore.

In addition, at the time of writing this report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Potentially Contaminating Activities or Land Uses

Three potentially contaminating activities were identified at the site, these are outlined in Table 2 below.

Table 2: Potentially Contaminating Activities: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Activity Description	HAIL Category
Historical Horticulture/Persistent Pesticide Use	A10

It should be noted that following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's used to control the Thrip infestation. In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

8.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 3 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 3: Preliminary Conceptual Site Model: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

9.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, Revised 2021).

Twelve discrete soil samples were collected from across the site and composited at the laboratory (4:1) to form three composite samples which are indicative and representative of the areas of the site potentially subject to historical horticultural, organo-chlorine pesticide spray use onsite. All samples were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 4 below.

Table 4: Sample Analysis Information: Lot 4 DP 55480, Old Wairoa Road, Ardmore

Sample Name	Sample Depth	Number of Samples	HAIL Activity	Analysis Suite
COMP01 - COMP03	0 - 0.15m	3	Historical Horticulture/Pesticide use	• Total recoverable Arsenic, Copper & Lead; and • Organo-chlorine Pesticides.

The sample location plan is presented as Figure 2.

10.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

11.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICPMS. In accordance with in-house procedure based on US EPA method 200.8.
- Organo-chlorine Pesticides – sonication extraction – OCP Screen method, air dry, grind, sonication extraction GC-ECD.

12.0 Basis for Guideline Values

Following the plan change it is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

Furthermore, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153). The relevant values of the above guidelines have been reproduced in Table 5 below:

Table 5: Site Assessment Criteria: Lot 4 DP 55480, Old Wairoa Road, Ardmore (mg/kg)

Parameter	NES ($SCSs_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Copper	NL	325	45
Lead	210	250	65
Total DDT	70	12	-
Dieldrin	2.6	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg;

It is considered that the natural background levels of organo-chlorine pesticides are to be below the analytical levels of detection and if analysis shows any concentrations above the limit of detection would restrict material from being classified as cleanfill.

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

13.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 6 & 7 below and laboratory transcripts are provided in Appendix A.

13.1 Heavy Metals

Table 6: Heavy Metals Results: Lot 4 DP 55480, Old Wairoa Road, Ardmore (mg/kg).

Sample	As	Cu	Pb
COMP01	<2	20	21
COMP02	<5	21	26
COMP03	2	20	15.5

Note: Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

The concentrations of arsenic, copper and lead detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils and therefore below the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP.

13.2 Organo-chlorine Pesticides

Table 7: Organo-chlorine Pesticide Results: Lot 4 DP 55480, Old Wairoa Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
COMP01	<0.02	<0.05
COMP02	<0.02	<0.05
COMP03	<0.02	<0.05

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the analytical levels of detection, therefore below the cleanfill criteria, the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

14.0 Revised Conceptual Model of Exposure Pathways

The revised conceptual site model provided in Table 8 below expands on the potential sources of contamination (as identified above), following sampling and analysis, and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 8: Revised Conceptual Site Model: Lot 4 DP 55480, Old Wairoa Road, Ardmore.

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Residential land use.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No concentrations of contaminants detected in exceedance of the SCS Commercial/industrial worker
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Incomplete: No evidence of potential vapours or fibres identified at the site.
		Human Health – Commercial/Industrial Outdoor Worker	Incomplete: No evidence of potential vapours or fibres identified at the site.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Incomplete: No concentrations of contaminants detected in exceedance of the AUP: OP

15.0 Regulatory Requirements

15.1 The National Environmental Standard

Due to the potentially contaminating land uses identified above, it is considered that an activity described in the HAIL is being, has been, or is more likely than not to have been undertaken at the site.

Resource Consent will therefore likely be required for the site under the District Plan, following the introduction of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES).

In reference to the NES the following assessment was made in determining the activity status of the proposed works:

- The land is covered by the NES under regulation 5.7(b) 'an activity or industry described in the HAIL has been undertaken on it'.
- The activity is disturbing soil under regulation 5(4)(a) 'means disturbing the soil of the piece of land for a particular purpose'.
- The activity will unlikely comply with regulation 8(3)(c) 'the volume of the disturbance of the soil of the piece of land must be no more than 25m^3 per 500m^2' and '…a maximum of 5 m^3 per 500 m^2 of soil may be taken away'.
- A detailed site investigation for the piece of land does exist.

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

15.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules must be considered.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

As there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

16.0 Conclusions and Recommendations

This DSI has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled *'Preliminary Site Investigation, Ardmore Block Plan Change Area, Lot 4 DP 55480, Old Wairoa Road, Ardmore, Auckland'* dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, during the desktop study as part of the PSI, the Auckland Council Site Contamination Enquiry stated that the site had potentially been used for horticultural purposes. During an interview with the property owner it was stated that this area of the site was only used for growing maize for cattle feed, and that the paddocks had been subject to a Thrip infestation and therefore pesticide sprays were used to eliminate this. No other activity or industry described in the Hazardous Activities and Industries List (HAIL) was identified onsite.

Following a review of the available historical photographs, no horticultural activities other than the maize growing described by the property owner was identified and the only sprays used were modern post 2000's, used to control the Thrip infestation.

In order to confirm this, as a conservative approach, indicative representative sampling of the site soils in these areas was recommended to determine if any organo-chlorine pesticides had been used on the site.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the HAIL has been, or is more likely than not to have been undertaken at the site.

Following the desk top assessment, the intrusive site investigation was carried out by Focus Environmental Services Limited personnel on 24th March 2021.

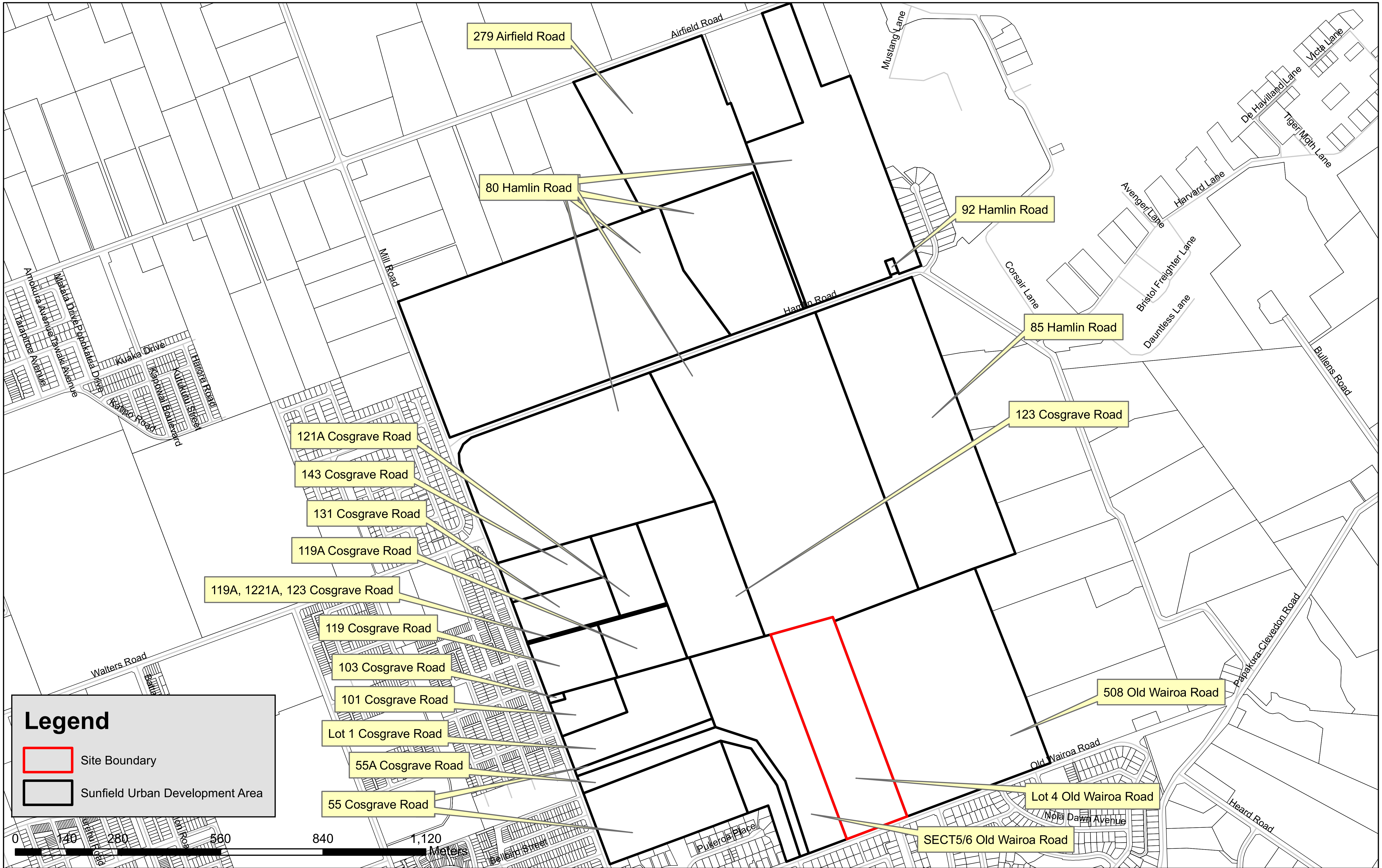
As part of the investigation, twelve discrete samples were composited at the laboratory (4:1) to form three composite samples from the area where organo-chlorine pesticide sprays were potentially used.

The results of the sample analysis have shown the concentrations of all contaminants of concern detected were below the maximum Auckland background concentrations for non-volcanic soils and therefore the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES) and the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part (AUP: OP).

As the concentrations of contaminants detected were below the background concentrations for the site, in accordance with Regulation 5(9), the regulations of the NES do not apply to site.

In addition, as there were no contaminants detected above the levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP, the contaminated land rules of the AUP: OP will unlikely be triggered by the current proposal.

Figures


279 Airfield Road
80 Hamlin Road
92 Hamlin Road
85 Hamlin Road
123 Cosgrave Road
121A Cosgrave Road
143 Cosgrave Road
131 Cosgrave Road
119A Cosgrave Road
119A, 1221A, 123 Cosgrave Road
119 Cosgrave Road
103 Cosgrave Road
101 Cosgrave Road
Lot 1 Cosgrave Road
55A Cosgrave Road
55 Cosgrave Road
508 Old Wairoa Road
Lot 4 Old Wairoa Road
SECT5/6 Old Wairoa Road
Airfield Road
Hamlin Road
Mill Road
Walters Road
Old Wairoa Road
Papakura-Clevedon Road
Bullens Road
Heard Road
Mustang Lane
Victa Lane
De Havilland Lane
Tiger Moth Lane
Avenger Lane
Harvard Lane
Corsair Lane
Bristol Freighter Lane
Dauntless Lane
Nola Dawn Avenue
Pukeroa Place
Kuaka Drive
Legend
Site Boundary
Sunfield Urban Development Area
0 140 280 560 840 1,120
Meters

Focus Environmental Services Limited
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Ellerslie
Auckland 1542

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www.focusenvironmental.co.nz

Winton Land Limited
Lot 4 DP55480 Old Wairoa Road
Sunfield Urban Development Area
Papakura
Auckland

Figure 1: Site Location Plan
Detailed Site Investigation

1443.012 (R5)

Drawing Number: 1443.012.01
Drawn By: MT
Checked By: DO'R
Date: 19/12/2023

FOCUS ENVIRONMENTAL SERVICES LTD Focus Environmental Services Limited PO Box 11455 Ellerslie Auckland 1542 Ph: +64 9 579 4155 www.focusenvironmental.co.nz	**Winton Land Limited** Lot 4 DP 55480 Old Wairoa Road Sunfield Urban Development Area Papakura Auckland	**Figure 2: Sample Location Plan** Detailed Site Investigation	N 1443.012 R5	Drawing Number: 1443.012.03 Drawn By: MT Checked By: DO'R Date: 19/12/2023

Appendices

Appendix A – Illustrative Masterplan

Appendix B – Environmental HAIL

Ministry for the Environment
Manatū Mō Te Taiao

Hazardous Activities and Industries List (HAIL)

October 2011

A Chemical manufacture, application and bulk storage

1. Agrichemicals including commercial premises used by spray contractors for filling, storing or washing out tanks for agrichemical application
2. Chemical manufacture, formulation or bulk storage
3. Commercial analytical laboratory sites
4. Corrosives including formulation or bulk storage
5. Dry-cleaning plants including dry-cleaning premises or the bulk storage of dry-cleaning solvents
6. Fertiliser manufacture or bulk storage
7. Gasworks including the manufacture of gas from coal or oil feedstocks
8. Livestock dip or spray race operations
9. Paint manufacture or formulation (excluding retail paint stores)
10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
11. Pest control including the premises of commercial pest control operators or any authorities that carry out pest control where bulk storage or preparation of pesticide occurs, including preparation of poisoned baits or filling or washing of tanks for pesticide application
12. Pesticide manufacture (including animal poisons, insecticides, fungicides or herbicides) including the commercial manufacturing, blending, mixing or formulating of pesticides
13. Petroleum or petrochemical industries including a petroleum depot, terminal, blending plant or refinery, or facilities for recovery, reprocessing or recycling petroleum-based materials, or bulk storage of petroleum or petrochemicals above or below ground
14. Pharmaceutical manufacture including the commercial manufacture, blending, mixing or formulation of pharmaceuticals, including animal remedies or the manufacturing of illicit drugs with the potential for environmental discharges
15. Printing including commercial printing using metal type, inks, dyes, or solvents (excluding photocopy shops)
16. Skin or wool processing including a tannery or fellmongery, or any other commercial facility for hide curing, drying, scouring or finishing or storing wool or leather products
17. Storage tanks or drums for fuel, chemicals or liquid waste
18. Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside

B Electrical and electronic works, power generation and transmission

1. Batteries including the commercial assembling, disassembling, manufacturing or recycling of batteries (but excluding retail battery stores)

2. Electrical transformers including the manufacturing, repairing or disposing of electrical transformers or other heavy electrical equipment
3. Electronics including the commercial manufacturing, reconditioning or recycling of computers, televisions and other electronic devices
4. Power stations, substations or switchyards

C Explosives and ordinances production, storage and use

1. Explosive or ordinance production, maintenance, dismantling, disposal, bulk storage or re-packaging
2. Gun clubs or rifle ranges, including clay targets clubs that use lead munitions outdoors
3. Training areas set aside exclusively or primarily for the detonation of explosive ammunition

D Metal extraction, refining and reprocessing, storage and use

1. Abrasive blasting including abrasive blast cleaning (excluding cleaning carried out in fully enclosed booths) or the disposal of abrasive blasting material
2. Foundry operations including the commercial production of metal products by injecting or pouring molten metal into moulds
3. Metal treatment or coating including polishing, anodising, galvanising, pickling, electroplating, or heat treatment or finishing using cyanide compounds
4. Metalliferous ore processing including the chemical or physical extraction of metals, including smelting, refining, fusing or refining metals
5. Engineering workshops with metal fabrication

E Mineral extraction, refining and reprocessing, storage and use

1. Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition
2. Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)
3. Cement or lime manufacture using a kiln including the storage of wastes from the manufacturing process
4. Commercial concrete manufacture or commercial cement storage
5. Coal or coke yards
6. Hydrocarbon exploration or production including well sites or flare pits
7. Mining industries (excluding gravel extraction) including exposure of faces or release of groundwater containing hazardous contaminants, or the storage of hazardous wastes including waste dumps or dam tailings

F Vehicle refuelling, service and repair

1. Airports including fuel storage, workshops, washdown areas, or fire practice areas
2. Brake lining manufacturers, repairers or recyclers
3. Engine reconditioning workshops
4. Motor vehicle workshops
5. Port activities including dry docks or marine vessel maintenance facilities

6. Railway yards including goods-handling yards, workshops, refuelling facilities or maintenance areas
7. Service stations including retail or commercial refuelling facilities
8. Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances

G Cemeteries and waste recycling, treatment and disposal

1. Cemeteries
2. Drum or tank reconditioning or recycling
3. Landfill sites
4. Scrap yards including automotive dismantling, wrecking or scrap metal yards
5. Waste disposal to land (excluding where biosolids have been used as soil conditioners)
6. Waste recycling or waste or wastewater treatment

H Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment

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

Appendix C – Laboratory Transcripts

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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

Certificate of Analysis

Client:	Focus Environmental Services Limited	**Lab No:**	2566806	SPv1
Contact:	Elliot Dillon-Herzog	**Date Received:**	25-Mar-2021	
	C/- Focus Environmental Services Limited	**Date Reported:**	30-Mar-2021	
	PO Box 11455	**Quote No:**	80876	
	Ellerslie	**Order No:**		
	Auckland 1542	**Client Reference:**	1443.012	
		Submitted By:	Elliot Dillon-Herzog	

Sample Type: Soil

		Sample Name:	Composite of COMP01 A, COMP01 B, COMP01 C and COMP01 D	Composite of COMP02 A, COMP02 B, COMP02 C and COMP02 D	Composite of COMP03 A, COMP03 B, COMP03 C and COMP03 D		
		Lab Number:	2566806.13	2566806.14	2566806.15		
Individual Tests							
Dry Matter	g/100g as rcvd		77	72	76	-	-
Total Recoverable Arsenic	mg/kg dry wt		< 2	< 5	2	-	-
Total Recoverable Copper	mg/kg dry wt		20	21	20	-	-
Total Recoverable Lead	mg/kg dry wt		21	26	15.5	-	-
Organochlorine Pesticides Screening in Soil							
Aldrin	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
alpha-BHC	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
beta-BHC	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
delta-BHC	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
gamma-BHC (Lindane)	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
cis-Chlordane	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
trans-Chlordane	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
2,4'-DDD	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
4,4'-DDD	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
2,4'-DDE	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
4,4'-DDE	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
2,4'-DDT	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
4,4'-DDT	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Total DDT Isomers	mg/kg dry wt		< 0.08	< 0.09	< 0.08	-	-
Dieldrin	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Endosulfan I	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Endosulfan II	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Endosulfan sulphate	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Endrin	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Endrin aldehyde	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Endrin ketone	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Heptachlor	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Heptachlor epoxide	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Hexachlorobenzene	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-
Methoxychlor	mg/kg dry wt		< 0.014	< 0.014	< 0.013	-	-

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 Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	13-15
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%.	-	13-15
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	13-15
Dry Matter (Env)	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	13-15
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	13-15
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	13-15
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	13-15

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

Testing was completed between 29-Mar-2021 and 30-Mar-2021. 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.

Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental

DETAILED SITE INVESTIGATION
REMEDIATION ACTION PLAN
&
ASSESSMENT OF ENVIRONMENTAL EFFECTS
508 OLD WAIROA ROAD
ARDMORE
AUCKLAND

For the Attention of:

Winton Land Limited

Reference: FES 1443.010 December 2023 (R5)

Company Information

Focus Environmental Services Limited

PO Box 11455

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Auckland 1542

Telephone: +64 9 579 4155

Email: mail@focusenvironmental.co.nz

Quality Information

Project Name	DSI, RAP & AEE 508 Old Wairoa Road, Ardmore
Project Number	1443.010 (R5)
File Reference	M:\2023 Jobs\Winton\Sunfield Development\Completed Reports\508 Old Wairoa Road (R3)\01 Report\R5\1443.010_DSI_RAP_AEE_MT_R5.docx
Date Issued	April 2021
Date Revised	December 2023

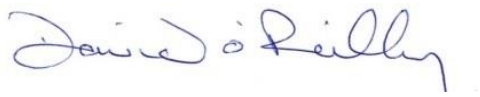
Author

Megan Thomas
Environmental Scientist

Reviewed

Claire Johnson
Environmental Scientist

Authorised



David O'Reilly
Principal Environmental Consultant

Distribution List

Parties	Copies
Winton Land Limited	1
Focus Environmental Services Limited	1

Contents

Executive Summary

This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

Focus Environmental Services Limited was contracted by Winton Land Limited to carry out a Detailed Site Investigation, Remediation Action Plan and Assessment of Environmental Effects (DSI, RAP & AEE) at 508 Old Wairoa Road, Ardmore, Auckland. The legal description of the site is DP 10383 with an area of 23.63ha.

It should be noted that this report has been revised following the request of the client.

The Sunfield Urban Development Area (UDA) consists of nineteen properties located across Cosgrave Road, Old Wairoa Road, Hamlin Road and Airfield Road, Papakura, Auckland.

The scope of this report is limited to the property at 508 Old Wairoa Road, Ardmore, and should be read in conjunction with the cover letter summarising the findings of the PSIs and DSIs completed for the Sunfield UDA.

This DSI, RAP & AEE is for the site located at 508 Old Wairoa Road, Ardmore. At the request of the client, this report has been revised following subdivision of the parent property in which the site formerly included what is now 85 Hamlin Road. The legal description of the site is DP 10383 with an area of 23.63ha.

This DSI, RAP & AEE has been prepared in general accordance with the requirements of the Contaminated Land Management Guidelines No. 1 and No. 5 (Ministry for the Environment, Revised 2021).

The history of the site has been described in the report titled '*Preliminary Site Investigation, 508 Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the current site buildings and demolished historical structures, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, potentially uncertified filling and spray race activities were also identified across the site.

In addition, dumping and the potential burning of refuse was observed.

An additional site inspection and walkover was undertaken to supplement the information provided in the PSI on the 25th of March 2021.

During the site inspection and walkover, visual evidence of PACM was observed intermixed with the site soils at what is now 85 Hamlin Road, and a structure was observed with extensive fire damage at the site. The soils in the areas of potential refuse burning identified as part of the PSI were inspected, however no evidence of burning was identified.

Due to the potential sources of contamination identified, it is considered that there is evidence to suggest that an activity outlined in the Hazardous Activities Industries List (HAIL) has been, or is more likely than not to have been undertaken at the site.

Following the site inspection and walkover, the intrusive investigation was carried out by Focus Environmental Services Limited personnel where a total of nine discrete soil samples were collected from the areas of potentially contaminating activities across the site. In addition, six test pits and four hand augers were extended to a maximum depth of 2.3m and 1.0m below ground level (bgl) respectively, with representative samples obtained at varying depths.

The results of the sample analysis and investigation indicate that the site soils across the site are contaminated above the $SCS_{(health)}$ for residential land use as outlined in the NES and/or the discharge criteria of the AUP: OP for arsenic, lead, zinc and asbestos fibres. Furthermore, concentrations of heavy metals were detected in exceedance of the NES (SCS) for commercial/industrial worker, and therefore may pose a short-term risk to site workers.

Due to the elevated levels of contaminants detected, the site at 508 Old Wairoa Road, Ardmore will require remediation of the affected soils prior to being redeveloped. The estimated volume of soil requiring remediation is 7,206.7m^3. It should be noted that this volume may change during the remedial process.

Due to the volume of soil requiring remediation, a combination of offsite disposal and/or onsite management may be adopted as the remedial approach for the site.

A restricted discretionary consent is required under Regulation 10 of the NES as the proposed subdivision, change of use and soil disturbance are unlikely to meet the requirements of a permitted activity under Regulation 8 of the NES, and as this detailed site investigation for the piece of land has shown that the soil contamination does exceed the applicable standard for residential land use.

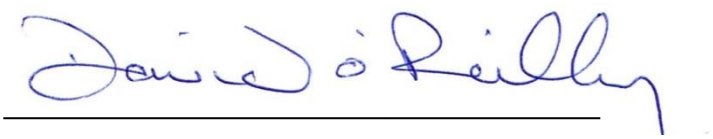
Due to the estimated volume of material containing concentrations of contaminants elevated above those values specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP being 7,134.7m^3, which is above 200 m^3, it is considered that the proposed remediation will likely not meet the permitted activity requirements under rule E30.6.1.2 of the AUP: OP and therefore resource consent under the AUP: OP will be required.

In addition, in the event that following the proposed development, concentrations of contaminants at levels elevated above the discharge criteria as outlined in the AUP: OP are to be encapsulated onsite, a long-term site monitoring and management plan and long-term discharge consent under rule E30.6.2.1 of the AUP: OP will likely be required.

The objective of this Remediation Action Plan is to ensure that the soils contaminated above the adopted site assessment criteria are handled, removed in a controlled manner, and disposed of to a suitable disposal location. All earthworks required as part of the remedial works should be carried out in accordance with this Remediation Action Plan.

An assessment of the effects which may occur as a result of the proposed works has been made in order to mitigate any potential adverse environmental and/or human health effects. If the controls outlined in this Remediation Action Plan are implemented during the works it is considered that the effects on the environment and human health are likely to be effectively mitigated.

This report is certified by David O'Reilly, Suitability Qualified and Experienced Practitioner (SQEP):



Principal Environmental Consultant
Focus Environmental Services Limited

1.0 Scope

1.1 This report has been prepared at the request of Winton Land Limited ("the client") in terms of the Focus Environmental Services Limited Agreement ("Agreement").

1.2 The following report is based on:

- *Information provided by "the Client";*
- *'Preliminary Site Investigation, 508 Old Wairoa Road, Ardmore, Auckland' dated December 2020 and prepared by Focus Environmental Services Limited;*
- *A site walkover and inspection; and*
- *Site investigation and soil sampling.*

1.3 We have not independently verified the information provided to us by the client or its completeness. We do not express an opinion on the accuracy or the reliability of such information.

1.4 No warranties are given, intended or implied.

1.5 Opinion, inferences, assumptions and interpretations made in this report should not be construed as legal opinion.

1.6 Where an assessment is given in this report, the client must also rely upon their own judgement, knowledge and assessment of the subject of this report before undertaking any action.

1.7 This report must not be used in any other context or for any other purpose other than that for which it has been prepared without the prior written consent of Focus Environmental Services Limited.

1.8 This report is strictly confidential and intended for the sole use of the client and shall not be disclosed without the prior written consent of Focus Environmental Services Limited.

1.9 This Focus Environmental Services Limited report is produced under a management system certified as complying with ISO 45001:2018 by SGS New Zealand.

2.0 Site Identification

The property is located at 508 Old Wairoa Road, Ardmore, Auckland as shown in Figure 1 attached. The legal description of the site is DP 10383 with an area of 23.63ha. The site is located at national grid reference 1774879mE and 5898176mN.

The site is rectangular in shape and is zoned 'Future Urban Zone' and 'Rural – Mixed Rural Zone' under the Auckland Unitary Plan – Operative in Part (AUP: OP).

The site location plan is presented as Figure 1.

3.0 Proposed Site Redevelopment Activity

It is proposed that the site will be redeveloped for residential purposes. As part of the redevelopment, the site will undergo subdivision, a change of land use and disturbance of soils.

The illustrative masterplan is attached as Appendix A.

4.0 Geology and Hydrology

Published geological maps[1] indicate that the site at 508 Old Wairoa Road, Ardmore is underlain with non-volcanic deposits of the Tauranga Group and the East Coast Bays Formation.

A description of the underlying geologies is presented in Tables 1 & 2 below.

Table 1: Geology of 508 Old Wairoa Road, Ardmore

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	Mud
Description	Sand, silt mud and clay with local gravel and peat beds
Subsidiary rocks	Sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	mudstone
Rock class	Clastic sediment

Table 2: Geology of 508 Old Wairoa Road, Ardmore

Key name	East Coast Bays Formation of Warkworth Subgroup (Waitemata Group)
Simple name	Neogene sedimentary rocks
Main rock name	turbidite
Description	Alternating sandstone and mudstone with variable volcanic content and interbedded volcaniclastic grits
Subsidiary rocks	Sandstone mudstone grit
Key group	Waitemata Group
Stratigraphic lexicon name	East Coast Bays Formation
Absolute age (min)	16.4 million years
Absolute age (max)	23.8 million years
Rock group	Alternating sandstone/siltstone
Rock class	Clastic sediment

[1] Geology of the Auckland Area (Institute of Geological &Nuclear Sciences 1:250,000 geological map 3, 2011)

No groundwater investigation was completed as part of this investigation.

The nearest surface water body to the site, as identified in the ecological report titled *'Cosgrave Road Plan Change: Baseline Ecology'* and dated April 2023, is an artificial drainage channel which runs through the centre of the site.

5.0 Regulatory Framework

5.1 The National Environmental Standard

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on the 1st of January 2012 and supersedes any District Plan rules that related to contaminated land. Any Regional Plan rules relating to contaminated land are still applicable.

In brief, the objective of the NES is to ensure that land affected by contaminants is identified and assessed and, if necessary, remediated or managed to protect human health. The NES only applies to the activities: removing or replacing all, or part of, a fuel storage system; sampling the soil; disturbing the soil; subdividing the land; and changing the land use, and where an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, has been, or is more likely than not to have been undertaken on the piece of land.

The NES also contains reference to the soil contaminant standards for human health ($SCS_{(health)}$), for a variety of land use scenarios along with reference to best practice reporting documents.

The environmental HAIL is attached as Appendix B.

5.2 Auckland Unitary Plan: Operative in Part

The contaminated land rules of the Auckland Unitary Plan: Operative in Part (AUP: OP) have immediate legal effect following its notification. As the AUP: OP was notified on the 15th of November 2016 the contaminated land rules of the AUP: OP must be considered.

In brief, the objective of the AUP: OP is to manage land containing elevated levels of contaminants to protect human health and the environment and to enable the effective use of the land.

The contaminated land rules of the AUP: OP apply when the land contains contaminants above those levels specified in Table E30.6.1.4.1 of Chapter E30 of the AUP: OP.

6.0 Background

The history of the site has been described in the report titled '*Preliminary Site Investigation, 508 Old Wairoa Road, Ardmore, Auckland*' dated December 2020 and prepared by Focus Environmental Services Limited (henceforth referred to as the "PSI").

In brief, due to the age of the current site buildings and demolished historical structures, the potential for ground contamination from the historic use of lead-based paints and asbestos containing materials was identified. Furthermore, potentially uncertified filling and spray race activities were also identified across the site.

In addition, dumping and potential burning of refuse was observed.

It should be noted that the potential sources of contamination (as identified above) were limited to a historical review, and therefore, prior to the commencement of any works at the property, it was recommended that a site walkover and inspection be completed in order to confirm the potentially contaminating land uses and/or activities carried out at the site.

In addition, at the time of writing the report, the results of a detailed geotechnical investigation covering the site was not available.

7.0 Additional Site Walkover

An additional site inspection and walkover was undertaken to supplement the information provided in the PSI on the 25th of March 2021. The site inspection and walkover were undertaken during a period of fine weather.

During the site inspection and walkover, the following was noted; fire damage to the shed (shed 6) was observed, and significant potentially asbestos containing material (PACM) along with scorched earth and ash were observed surrounding the structure.

Furthermore, the areas of potential refuse burning, including a minor amount of fence posts, were inspected and no evidence of burning was identified. This material was observed to be stockpiled and intermixed with onsite vegetation, potentially with the intention to be burnt. The extent of this is shown in Figure 2 attached.

The additional site features are presented as Figure 2 and additional site inspection photographs as Appendix C.

8.0 Potentially Contaminating Activities or Land Uses

Following a review of the desktop assessment presented in the PSI and the subsequent site walkover and inspection at the site, five potentially contaminating activities were identified and are outlined in Table 3 below.

Table 3: Potentially Contaminating Activities: 508 Old Wairoa Road, Ardmore

Activity Description	HAIL Category
Livestock Dip of Spray Race Operations	A8
Demolition/Burning of Historic or Current Structures Potentially Containing Asbestos & Potentially Asbestos Containing Materials Intermixed with the Site Soils	E1
Maintenance and Use of Lead-based Paint	I
Potentially Uncertified Filling	I
Burning of Building	I

It should be noted that the burning of refuse, as outlined in the PSI, was omitted as no evidence of burning was identified during the additional site walkover and inspection.

9.0 Conceptual Model of Exposure Pathways

The preliminary conceptual site model provided in Table 4 below expands on the potential sources of contamination (as identified above) and exposure pathways and was based on the potential effects of the proposed subdivision, change of use and soil disturbance activities on human health and the environment.

Table 4: Preliminary Conceptual Site Model: 508 Old Wairoa Road, Ardmore

Potential Source	Potential Pathways	Potential Receptors	Assessment
Contaminated Soil	Dermal Contact with Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Ingestion of Contaminated Soils	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Inhalation of Vapours/Fibres	Human Health – Residential Land Use	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
		Human Health – Commercial/Industrial Outdoor Worker	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Surface Water Run-off	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.
	Migration of Groundwater	Ecological Receptors - Artificial Drainage Channel	Potentially Complete: Sampling and analysis is recommended to confirm the concentrations of contaminants in soil.

10.0 Sampling and Analysis Plan and Sampling Method

Environmental Sampling was carried out in accordance with the Contaminated Land Management Guidelines No. 5 (MfE, revised 2021).

Nine discrete surface soil samples were collected from across the site and were sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 5 below.

Table 5: Discrete Sample Analysis Information: 508 Old Wairoa Road, Ardmore

Sample ID	Sample Depth	No. of Samples	HAIL Activity	Analysis Suite
SR01 – SR02	0.0-0.15m	2	Spray Race Operations	• Total recoverable As, Cu, Pb; and • Organochlorine Pesticides
HB05	0.0-0.15m	1	Demolition/Burning of Historic or Current Structures Potentially Containing Asbestos & Potentially Asbestos Containing Materials Intermixed with the Site Soils Maintenance and Use of Lead-based Paint	• Total recoverable Pb • Semi-quantitative Asbestos in Soil (NZ Guidelines).
Pb01-Pb02& Pb10 - Pb11	0.0-0.15m	4	Maintenance and Use of Lead-based Paint	• Total recoverable Pb
Pb05	0.0-0.15m	1	Maintenance and Use of Lead-based Paint Burning of Building	• Total recoverable As, Cd, Cr, Cu, Pb, Ni, Zn; and • Polycyclic–Aromatic Hydrocarbons
ASB03	0.0-0.15m	1	Demolition/Burning of Historic or Current Structures Potentially Containing Asbestos & Potentially Asbestos Containing Materials Intermixed with the Site Soils	• Semi-quantitative Asbestos in Soil (NZ Guidelines).

In addition, six test pits (TP01-TP06) were completed to a maximum depth of 2.3m below ground level (bgl). The test pits were inspected for visual and olfactory evidence of contamination and were photographed and logged in accordance with NZ Geotechnical Society Guidelines.

One representative sample was collected from four test locations at varying depths, and was sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 6 below.

Table 6: Test Pit Sample Analysis Information: 508 Old Wairoa Road, Ardmore

Sample ID	Sample Depth	HAIL Activity	Analysis Suite
TP01 0.0-0.5m	0.0-0.5m	Potentially Uncertified Filling	• Total recoverable As, Cd, Cr, Cu, Pb, Ni & Zn; • Organochlorine Pesticides; • Polycyclic-Aromatic Hydrocarbons; and • Semi-quantitative Asbestos in Soil (NZ Guidelines).
TP02 0.5-1.0m	0.5-1.0m		
TP03 1.5-2.0m	1.5-2.0m		
TP05 1.0-1.5m	1.0-1.5m		

Furthermore, four hand augers (HA01-HA04) were completed to a maximum depth of 1.0m below ground level (bgl). The hand auger location was inspected for visual and olfactory evidence of contamination and were photographed and logged in accordance with NZ Geotechnical Society Guidelines.

One representative sample was collected from each hand auger location, and was sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 7 below.

Table 7: Hand Auger Sample Analysis Information: 508 Old Wairoa Road, Ardmore

Sample ID	Sample Depth	HAIL Activity	Analysis Suite
HA01 0.5m	0.5m	Potentially Uncertified Filling	• Total recoverable As, Cd, Cr, Cu, Pb, Ni & Zn; • Organochlorine Pesticides; • Polycyclic-Aromatic Hydrocarbons; and • Semi-quantitative Asbestos in Soil (NZ Guidelines).
HA02 SUR	SUR		
HA03 0.5m	0.5m		
HA04 0.2m	0.2m		

One bulk material sample was collected from PACM building materials identified in contact with the site soils. The sample was sent under full chain of custody documentation to an IANZ accredited laboratory. Sampling and Analysis information is provided in Table 8 below.

Table 8: Bulk Material Sample Analysis Information: 508 Old Wairoa Road, Ardmore

Sample ID	No. of Samples	HAIL Activity	Analysis Suite
PACM03	1	Demolition/Burning of Historic or Current Structures Potentially Containing Asbestos & Potentially Asbestos Containing Materials Intermixed with the Site Soils	• Asbestos in Bulk Materials (Presence/Absence)

Furthermore, a visual inspection for ACM was undertaken at each test pit and hand auger location. The visual inspection was undertaken in accordance with the 'New Zealand Guidelines for Assessing and Manging Asbestos in Soil' (BRANZ Limited, 2017).

The hand auger logs and photographs are attached as Appendix D.

The sample location plan is presented as Figure 3.

11.0 Field Sampling Quality Assurance

All sampling implements were triple washed between samples using clean tap water, followed by a solution of laboratory grade phosphate free detergent (Decon 90), and a final rinse with clean water.

Clean, nitrile gloves were worn when handling each sample. Samples were stored in laboratory cleaned glass jars or laboratory supplied 500ml plastic containers and immediately placed in an iced cooler. The samples were transported under chain of custody documentation to an IANZ accredited laboratory for analysis.

12.0 Laboratory Quality Assurance

Routine laboratory quality assurance procedures include analysis of laboratory blanks and spiked samples. All analyses were carried out using industry standard methods as follows:

- Total Recoverable Metals – Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICPMS screen level, interference removal by Kinetic Energy Discrimination if required.
- Organo-chlorine Pesticides – Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.
- Polycyclic Aromatic Hydrocarbons – Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.
- Asbestos in Bulk Materials - Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.
- Semi–quantitative Asbestos in Soil – Calculated from weight of fibrous asbestos plus asbestos fines (AF/FA) and the weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.

13.0 Basis for Guideline Values

If developed, it is proposed that the site will be developed for residential land use, therefore the guideline values of the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use (10% produce consumption), as outlined in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), and the discharge criteria of the Auckland Unitary Plan: Operative in Part (AUP: OP) are considered relevant and have been adopted as the site assessment criteria.

In addition, as the NES does not contain a reference value for asbestos in soil, in accordance with the hierarchy described in the Contaminated Land Management Guidelines No. 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), the soil guideline value for asbestos in New Zealand for residential land use, taken from the New Zealand Guidelines for Assessing and Manging Asbestos in Soil (BRANZ Limited, 2017) of 0.001% combined fibrous asbestos and asbestos fines (FA/AF) and/or 0.01% asbestos containing material (ACM) has been adopted as the site assessment criteria.

Furthermore, due to the underlying geology at the site, the concentrations of heavy metals detected will be compared to the maximum background levels for non-volcanic soils in Auckland[2] (TP153). The relevant values of the above guidelines have been reproduced in Table 9 below.

Table 9: Site Assessment Criteria: 508 Old Wairoa Road, Ardmore (mg/kg)

Parameter	NES ($SCSs_{(health)}$)	AUP: OP	TP153 (Non-Volcanic)
Arsenic	20	100	12
Cadmium	3	7.5	0.65
Chromium	460	400	55
Copper	NL	325	45
Lead	210	250	65
Nickel	400[1]	105	35
Zinc	7400[1]	400	180
BaP eq.	10	20	-
Total DDT	70	12	-
Dieldrin	2.6	0.5[2]	-
Asbestos (AF/FA)	0.001%[3]/0.01%[4]	-	-
Visual ACM	No Visual Evidence of ACM[5]	-	-

Note: NL = Not Limited. This is where the derived values exceed 10,000mg/kg; 1. = No Soil Contaminant Standards for health ($SCSs_{(health)}$) given, guideline values derived in accordance with the Contaminated Land Management Guidelines number 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (MfE, 2011), and taken from the National Environment Protection (Assessment of Site Contamination)

[2] Background Concentrations of Inorganic Elements in Soils from the Auckland Region, Technical Publication No.153, Auckland Regional Council, 2001.

Measure 1999 for Low Density Residential land use, 2 = Soil Guideline Values to protect on-site ecological receptors taken from Ministry for the Environment Guidelines for Identifying, Investigating and Managing Risks Associated with Former Sheep-dip Sites, November 2006.; 3 = Soil guideline values for asbestos in Soil of 0.001% combined fibrous asbestos and asbestos fines (FA/AF), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 4 = Soil guideline values for asbestos in Soil of 0.01% asbestos containing material (ACM), taken from the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017); 5= No visual evidence of asbestos containing material in the upper 0.1m of soil in accordance with New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ Limited, 2017).

Furthermore, the natural background levels of organo-chlorine pesticides, polycyclic aromatic hydrocarbons and asbestos (visual evidence, AF & FA) are considered to be below the analytical levels of detection and hence the detection of these analytes would restrict material from being classified as cleanfill material.

14.0 Quality Control

14.1 Laboratory Verification

One sample (HA01 0.5m) was selected at random for duplicate analysis and Relative Percentage Difference (RPD) calculations. In accordance with the Contaminated Land Management Guidelines No.5 (MfE, Revised 2021) an RPD value of less than 30-50% is generally considered acceptable. If the results were below the laboratory detection limits the RPD was not calculated. The results of the RPD analysis are presented in Table 10 below.

Table 10: RPD Summary: 508 Old Wairoa Road, Ardmore

Parameter	HA01 0.5m
Arsenic	0.00
Cadmium	5.00
Chromium	6.45
Copper	12.24
Lead	3.77
Nickel	0.00
Zinc	5.8

Note: Results in *Italics* exceed 30% RPD. Results in red exceed 50% RPD.

The RPD values calculated for all the analytes were less than the acceptable range. Therefore, based on the results of the RPD analysis, the sample results are likely to be relatively consistent and repeatable.

The RPD calculations are presented as Appendix E.

15.0 Soil Sampling Results

Tabulated soil sampling results are presented in Tables 11 - 15 below and laboratory transcripts are provided in Appendix F.

15.1 Heavy Metals

Table 11: Heavy Metals Results: 508 Old Wairoa Road, Ardmore (mg/kg).

Sample	As	Cd	Cr	Cu	Pb	Ni	Zn
Pb01	-	-	-	-	*124*	-	-
Pb02	-	-	-	-	***510***	-	-
Pb05	*43*	*0.67*	*56*	*98*	***10,400***	10	***1,740***
Pb10	-	-	-	-	***1,430***	-	-
Pb11	-	-	-	-	***360***	-	-
HB05	-	-	-	-	***300***	-	-
SR01	*54*	-	-	45	46	-	-
SR02	6	-	-	32	29	-	-
HA01 0.5m	*13*	0.39	16	23	26	6	134
HA02 SUR	8	0.37	14	25	40	9	*250*
HA03 0.5m	2	0.21	8	5	9.5	3	43
HA04 0.2m	<2	<0.10	4	<2	5.0	<2	6
TP01 0.0-0.5m	***107***	*1.33*	*99*	*200*	*163*	*41*	***550***
TP02 0.5-1.0m	*14*	*1.41*	*96*	*118*	*160*	*74*	***2,400***
TP03 1.5-2.0m	*26*	0.19	21	36	32	33	94
TP05 1.0-1.5m	*13*	0.41	18	39	45	14	*250*

Note: Results in red exceed the Soil Contaminant Standards for health ($SCS_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the AUP: OP. Results in *Italics* exceed the maximum Auckland background concentrations for non-volcanic soils outlined in the Auckland Regional Council Technical Publication No.153, Oct 2001.

Concentrations of arsenic detected in samples Pb05, SR01, HA01 0.5m, TP01 0.0-0.5m, TP02 0.5-1.0m, TP03 1.5-2.0m and TP05 1.0-1.5m exceeded the maximum Auckland background concentrations for non-volcanic soils. In addition, the concentrations of arsenic detected in samples Pb05, SR01, TP01 0.0-0.5m and TP03 1.5-2.0m the $SCS_{(health)}$ for residential land use. The concentrations of arsenic detected in TP01 0.0-0.5m exceeded the discharge criteria as outlined in the AUP: OP.

With the exception of Pb05, TP01 0.0-0.5m and TP02 0.5-1.0m, the concentrations of cadmium, chromium and copper detected in all samples analysed were below the maximum Auckland background concentrations for non-volcanic soils.

Concentrations of lead detected in samples Pb01, Pb02, Pb05, Pb10, Pb11, HB05, TP01 0.0-0.5m and TP02 0.5-1.0m exceeded the maximum Auckland background concentrations for non-volcanic soils. In addition, the concentrations of lead detected in samples Pb02,

Pb05, Pb10 & HB05 were elevated above the $SCSs_{(health)}$ for residential land use and the discharge criteria as outlined in the AUP: OP. It should be noted that the concentrations of lead detected in sample Pb10 also exceeded the $SCSs_{(health)}$ for commercial/industrial worker.

With the exception of TP01 0.0-0.5m and TP02 0.5-1.0m, the concentration of nickel detected in all samples were below the maximum Auckland background concentrations for non-volcanic soils.

Concentrations of zinc detected in samples Pb05, HA02 SUR, TP01 0.0-0.5m, TP02 0.5-1.0m and TP05 1.0-1.5m exceeded the maximum Auckland background concentrations for non-volcanic soils. In addition, the concentrations of zinc detected in samples Pb05 and TP02 0.5-1.0m were elevated above the discharge criteria as outlined in the AUP: OP.

15.2 Organochlorine Pesticides

Table 12: Organochlorine Pesticide Results: 508 Old Wairoa Road, Ardmore (mg/kg).

Sample	Total DDT	Dieldrin
SR01	<0.07	<0.011
SR02	<0.08	<0.013
HA01 0.5m	<0.07	<0.012
HA02 SUR	<0.07	<0.012
HA03 0.5m	<0.07	<0.012
HA04 0.2m	<0.07	<0.011
TP01 0.0-0.5m	<0.08	<0.013
TP02 0.5-1.0m	<0.09	<0.014
TP03 1.5-2.0m	<0.08	*0.064*
TP05 1.0-1.5m	<0.08	<0.014

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

With the exception of soil sample TP03 1.5-2.0, the concentrations of organo-chlorine pesticides detected were below the analytical limit of detection and therefore below the cleanfill criteria.

The concentrations of organo-chlorine pesticides in all samples analysed were below the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

15.3 Polycyclic Aromatic Hydrocarbons

Table 13: Polycyclic Aromatic Hydrocarbon Results: 508 Old Wairoa Road, Ardmore (mg/kg).

Sample	BaP eq.
HA01 0.5m	*0.03*
HA02 SUR	*0.04*
HA03 0.5m	<0.03
HA04 0.2m	<0.03
TP01 0.0-0.5m	*0.09*
TP02 0.5-1.0m	*0.22*
TP03 1.5-2.0m	*0.04*
TP05 1.0-1.5m	*2.1*

Note: * = Residual levels of contaminants detected. Results in red exceed the Soil Contaminant Standards for health ($SCSs_{(health)}$) for residential land use. Results in **Bold** exceed the discharge criteria as outlined in the Auckland Unitary Plan: Operative in Part. Results in *Italics* exceed the cleanfill criteria.

With the exception of soil samples HA03 0.5m and HA04 0.2m, low-level concentrations of polycyclic-aromatic hydrocarbons were detected in all soil samples analysed, therefore exceeding the cleanfill criteria.

The concentrations of polycyclic-aromatic hydrocarbons detected in all samples analysed were below the $SCSs_{(health)}$ for residential land use as outlined in the NES and the discharge criteria of the AUP: OP.

15.4 Asbestos

Table 14: Asbestos in Soil Results: 508 Old Wairoa Road, Ardmore (Semi-Quantitative, %)

Sample	Asbestos Type	Asbestos (FA/AF %)	Asbestos (% ACM)
ASB03	Asbestos NOT Detected	<0.001	<0.001
HB05	Asbestos NOT Detected	<0.001	<0.001
HA01 0.5m	Asbestos NOT Detected	<0.001	<0.001
HA02 SUR	Asbestos NOT Detected	<0.001	<0.001
HA03 0.5m	Asbestos NOT Detected	<0.001	<0.001
HA04 0.2m	Asbestos NOT Detected	<0.001	<0.001
TP01 0.0-0.5m	Asbestos NOT Detected	<0.001	<0.001
TP02 0.5-1.0m	*Chrysotile (White Asbestos) Detected*	<0.001	*0.033*
TP03 1.5-2.0m	*Chrysotile (White Asbestos) Detected*	*0.038*	<0.001
TP05 1.0-1.5m	*Amosite (Brown Asbestos) and Chrysotile (White Asbestos) Detected*	*0.031*	<0.001

Note: * - denotes residual concentrations detected. Results in red exceed the adopted human health criteria. Results in *Italics* exceed the cleanfill criteria.

Excluding samples TP02 0.5-1.0m, TP03 1.5-2.0m & TP05 1.0-1.5m, the concentrations of asbestos detected in all of the samples analysed were below the analytical limit of detection and therefore below the clean fill criteria and the adopted human health criteria.

The concentration of asbestos fibres detected in soil samples TP02 0.5-1.0m, TP03 1.5-2.0m & TP05 1.0-1.5m were elevated above the adopted human health criteria.

Table 15: Asbestos in Bulk Materials Results: 508 Old Wairoa Road, Ardmore

Sample	Asbestos Type
PACM03	*Chrysotile (White Asbestos) Detected*

Results in red exceed the adopted human health criteria.

Asbestos was detected in the material sample (PACM03) sent for analysis.

In addition, visual evidence of asbestos was identified surrounding the burnt shed.

16.0 Extent of Contamination

The results of the sample analysis indicate that the site soils in localised areas of the site contain concentrations of contaminants above the $SCSs_{(health)}$ for residential land use as outlined in the NES and/or the discharge criteria of the AUP: OP for arsenic, lead, zinc and asbestos (AF/FA, w/w bonded ACM and visual evidence) fibres above the adopted human health criteria. Furthermore, concentrations of heavy metals were detected in exceedance of the $SCSs_{(health)}$ for commercial/industrial outdoor worker and therefore may pose a short-term risk to site workers.

Surface samples Pb10 and Pb11, taken from the soils surrounding the dwelling in the southern portion of the site contain concentrations of lead elevated above the $SCSs_{(health)}$ for residential land use, and the discharge criteria as outlined in the AUP: OP (Area 1).

Surface sample Pb02, taken from the vicinity of the shed in the southern portion of the site contained concentrations of lead elevated above the $SCSs_{(health)}$ for residential land use, and the discharge criteria as outlined in the AUP: OP (Area 2).

Surface sample HB05, taken from the vicinity of the historic building in the southern portion of the site contained concentrations of lead elevated above the above the $SCSs_{(health)}$ for residential land use, and the discharge criteria as outlined in the AUP: OP (Area 3).

Surface sample SR01, taken from the vicinity of the potential spray race operations at the site contained concentrations of arsenic elevated above the $SCSs_{(health)}$ for residential land use (Area 4).

Surface sample Pb05, taken from the vicinity of the burnt shed onsite contained concentrations of lead and arsenic elevated above the $SCSs_{(health)}$ for residential land use, and concentrations of lead and zinc elevated above the discharge criteria as outlined in the AUP: OP. Furthermore, the material sample PACM03, taken from this area was identified to contain asbestos (Area 5). It should be noted that concentrations of lead were also detected in this area elevated above the $SCSs_{(health)}$ for a commercial/industrial outdoor worker.

Test pit samples TP01 0.0-0.5, TP02 0.5-1.0m and TP03 1.5-2.0m, taken from the area of uncertified filling contained concentrations of arsenic elevated above the $SCSs_{(health)}$ for residential land use, concentrations of arsenic and zinc elevated above the discharge criteria as outlined in the AUP: OP, and concentrations of asbestos fibres above the adopted human health criteria (Area 6). It should be noted that concentrations of arsenic were also detected in the area of samples location TP01 0.0-0.5 elevated above the $SCSs_{(health)}$ for a commercial/industrial outdoor worker.

The estimated volume required to remove the contaminated soils from the site is presented in Table 16 below.

Table 16: Extent of Contamination: 508 Old Wairoa Road, Ardmore.

Location	Area (m2)	Depth (m)	Contaminant	Quantity (m^3)
Area 1	254	0.3	Pb	76.2
Area 2	96	0.3	Pb	28.8
Area 3	52	0.3	Pb	15.6
Area 4	240	0.3	As	72
Area 5	227	0.3	As, Pb, Zn & Visual ACM	68.1
Area 6	3,020	2.3	As, Zn & Asbestos	6,946
Total Volume				7,206.7
Total Tonnes (m^3 x 1.5)				**10,810.1 T**

The inferred extent of the contaminated soil at the site is presented in Figure 4. This estimate is based on the sampling and results available following the site investigation and it should be noted that the volume may increase or decrease following inspection and validation sampling.

The estimated area requiring a hand pick to remove the ACM from Area 5 is based on the visual observations made during the site investigation and it should be noted that this area may increase or decrease during the removal process.

Due to the elevated concentrations of contaminants outlined above (Areas 1 – 6), these areas of the site are unsuitable for development for residential land use without suitable remediation works, which may include onsite management.

All contaminated materials, including the stockpiled refuse materials removed from site will require disposal at a suitably licensed landfill facility. In addition, due to the concentrations of heavy metals detected, the selected disposal facility may require TCLP analysis prior to acceptance. if the results exceed the TCLP waste criteria, then disposal at a special waste facility may be required.

In addition, due to the low-level contamination identified within localised areas outside of the remediation areas of the site, these soils are not suitable for classification as cleanfill. It is considered that these soils with low-level contamination are suitable for retention and re-use onsite, however, if removed from site then these will require disposal to a suitably licensed managed fill facility, unless further sampling and analysis demonstrate otherwise.