D Haywood

Fraser Thomas

ENGINEERS • RESOURCE MANAGERS • SURVEYORS

999 GOULDS ROAD,
ROLLESTON

DETAILED SITE INVESTIGATION REPORT - CONTAMINATION

D HAYWOOD

999 GOULDS ROAD,
ROLLESTON

DETAILED SITE INVESTIGATION REPORT - CONTAMINATION

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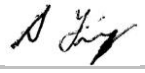
Status	Final	Signature	
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D HAYWOOD
DETAILED SITE INVESTIGATION REPORT - CONTAMINATION
999 GOULDS ROAD, ROLLESTON

EXECUTIVE SUMMARY

In response to instructions from David Haywood, Fraser Thomas Limited (FTL) undertook a detailed site investigation (DSI) for a portion of 999 Goulds Road, Rolleston (Lots 19-21, DP7589) that is proposed for residential development.

The subject site is currently listed under the Environment Canterbury - Listed Land Use Register (LLUR) as potentially contaminated due to possible exposure to persistent pesticide use associated with horticultural activities during the period of time 1962-1974. These activities fall within the Hazardous Activities & Industries List (HAIL) of the National Environmental Standard for Assessing and Managing contaminants in Soil to Protect Human Health (NESCS). In particular these activities are listed as:

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

The desktop information has confirmed that part of the subject site was subject to horticultural activity (possibly orchard) over at least the period 1974-84 and possibly as far back as 1962 based on the LLUR record, with horticultural activity having ceased prior to 1990.

Soil sampling from this area found:

- Arsenic, copper and lead concentrations were present at or below background levels, except in one sample, 2s, where they were slightly above background levels, but well below NESCS residential 10% produce consumption criteria.
- Organochlorine pesticides (OCPs) were below the laboratory limit of reporting.

Overall, the NESCS regulations are considered not to apply to the identified horticultural area under Regulation 5 (9), as the soil sampling results are considered representative of background levels, including allowing for the 2s sample. Hence, residential development can be undertaken within this area, without being subject to the NESCS.

Any excess soil from site development earthworks can be retained on site or disposed of off-site as cleanfill (e.g. Burwood), subject to compliance with the acceptance criteria of the disposal facility.

There are no other potential contamination issues at the subject site based on the site history information and intrusive soil investigation results reported herein. Based on this and on the discussion presented above, there do not appear to be any contamination issues at the subject site that might present a risk to the health of future residents. Likewise there does not appear to be any risk to the health of construction workers during the building phase. Hence it is highly unlikely that there will be a risk to human health from contaminants in soil from the proposed residential development.

However, if any visually stained or odorous soil is encountered during site development, works should stop in this area and Fraser Thomas should be advised immediately. Fraser Thomas would then inspect the relevant area and advise appropriate further investigation and/or remedial actions.

This investigation has been managed, reviewed and approved by a Suitably Qualified and Experienced Practitioner (SQEP), as defined in the NESCS.

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D HAYWOOD
DETAILED SITE INVESTIGATION REPORT - CONTAMINATION
999 GOULDS ROAD, ROLLESTON

1.0 INTRODUCTION

In response to instructions from David Haywood, Fraser Thomas Limited (FTL) undertook a targeted detailed site investigation (DSI) for a portion of 999 Goulds Road, Rolleston (Lots 19-21, DP7589) that is proposed for residential development.

The format of this report is as follows:

- Rationale, objectives and scope of work.
- Site details.
- Investigation methodology.
- Desktop study and site walkover results.
- Intrusive soil sampling.
- Discussion, conclusions and recommendations.
- Site plans, representative photographs and other relevant information in appendix form.

This investigation has been managed, reviewed and approved by a Suitably Qualified and Experienced Practitioner (SQEP), as defined in the National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS).

2.0 RATIONALE, OBJECTIVES AND SCOPE OF WORK

The main rationale and objectives for this investigation were:

- To identify the main actual or potential contamination issues due to historic use of land within the property.
- To confirm that the site is suitable or can be made suitable for the proposed residential development.
- To confirm whether excess excavated soil from site development works can be retained on-site or has to be disposed of off-site to an approved disposal facility.

3.0 INVESTIGATION METHODOLOGY

The methodology used for this site assessment is summarised below:

1. Desktop study involving review of existing historical information for the subject site including aerial photographs, certificates of title, Environment Canterbury (ECan) files (contaminated land and related information), and selected interviews with current land owners/tenants.
2. Site walkover investigation of the subject site, with visual appraisal to identify any disturbed and potentially contaminated areas. Relevant photographs are set out in Appendix C.
3. Intrusive soil sampling with analysis for relevant parameters based on the results of the desktop study.

4. Preparation of a DSI report including the results of the desktop study, site walkover survey, and conclusions and recommendations.
5. Provision of site plans, relevant documentation and representative photographs as appendices to this report.

Fraser Thomas Limited Health and Safety Management Plan procedures were followed throughout the duration of the investigation.

4.0 SITE DETAILS

4.1 LOCATION AND ZONING

The subject site is located at 999 Goulds Road, Rolleston (Lots 19-20, DP7589). The total site covers an area of 1.2138ha; however, the investigation was limited to the area subject to former horticultural activities (approximately 3,000m^2). The site is currently zoned Living Z under the Selwyn District Plan.

4.2 TOPOGRAPHY, GEOLOGY AND SOILS

The subject site is generally flat.

In assessing the geology of the site, reference has been made to the Institute of Geological & Nuclear Sciences Geological Map 16, scale 1:250,000, "Christchurch".

These maps indicate that the site is likely to be underlain by "Brownish-grey river alluvium" of the Springston Formation of Holocene age.

The limited sampling undertaken at the site confirms the geology described above.

4.3 PROPOSED DEVELOPMENT

The proposed work will involve residential development of part of the site. The details of the proposed development are not known. However these activities are likely to involve soil disturbance and are likely to produce spoil (i.e. excess soil).

5.0 DESKTOP STUDY AND WALKOVER SURVEY RESULTS

The results of the desktop study and the site walkover survey are summarised in this section and illustrated in the attached site features plan, aerial photographs (Appendix B) and site photographs (Appendix C). Throughout the site walkover survey, a visual assessment was used to classify any foreign materials as particular contaminants, without any formal identification. Hence, reference to a specific contaminant in the survey results should essentially be read as "suspected contaminant", unless otherwise stated.

5.1 SITE IDENTIFICATION AND USE

The site details and ownership history are summarised below.

Table 1: Site Details and Ownership History

Registered Owners	DH & JA Haywood	
Street Address	999 Goulds Road, Rolleston	
Legal Description	Lots 19-21, DP7589	
Total Area (ha)	1.2138	
Title	CB12K/1351	
Zoning	Living Z	
Ownership History		
CTs	**From**	**Registered Owner**
387/275 (Lot 19; 4046m^2)	Dec 1926	GL Bull (builder)
	Oct 1947	RG, RW and AJ Widdowson (woodworker, gardener, labourer)
	Jan 1969	RW Widdowson (farmer)
	Mar 1972	JT O'Dowd (Sales supervisor)
	Apr 1972	DK Billesdon (Sales manager)
	Dec 1972	BJ & DM Smolenski (machine operator and wife)
	Jun 1973	CE & SM Beardsmore (Sales Rep and wife)
	Sep 1973	CE & SM Beardsmore (Sales Rep and wife)
	Feb 1977	DW & HR Tilson
403/55 (Lot 20, 4046m^2)	Feb 1928	HH Lane (jeweller)
	Feb 1957	RW Widdowson (gardener)
	Mar 1972	JT O'Dowd (Sales supervisor)
	May 1972	DK Billesdon (Sales manager)
	Dec 1972	BJ & DM Smolenski (machine operator and wife)
	Jun 1973	CE & SM Beardsmore (Sales Rep and wife)
387/276 (Lot 21, 4046m^2)	Dec 1926	AG Familton (coal merchant)
	Dec 1972	BJ & DM Smolenski (machine operator and wife)
	Jun 1973	CE & SM Beardsmore (Sales Rep and wife)
CB12K/1351 (Lots 19-21)	Jul 1990	DH & JA Haywood

The CT information available does not indicate that the site was exposed to HAIL activities, although one owner's occupation was described as gardener/farmer over the period 1947/57 to 1972 for Lots 19 and 20, which are the two lots on which horticultural activity occurred for some time over that period.

5.2 INTERVIEWS

The current owner has lived at the site since 1990 and uses the property as a rural residential lifestyle block, with some animal grazing. Buildings on site comprise a dwelling, garage, carport, barn and pump house and they have added a shed and lean-to.

The owner believes the dwelling and most of the other buildings were constructed in the late 1960s/early 1970s. The land was in pasture when they bought it and they are not aware of any sheep dips, fuel storage, fill areas, historical chemical use from prior use.

They did have a tunnel greenhouse on the site for domestic use but this was destroyed by wind and disposed of to landfill. No sprays were used in this greenhouse.

They also used part of the site as a garden area for growing vegetables for personal use and grazing stock throughout 1990-2004 (refer drawing 32437/01).

They occasionally apply “Mitre 10 type” weed killer around the site.

They are aware of a small part of the site having been ploughed in 1998, involving turning the upper 0.5m of soil over (refer drawing 32437/01).

5.3 AERIAL PHOTOGRAPHS

Historical aerial photographs from 1942, 1974, 1984, 1995 and 2015 were reviewed as part of the desktop study. All photos were accessed from the Canterbury Regional Council website except for the 2015 one which was sourced from Google Earth.

1942 Aerial

The 1942 aerial shows that the site and its immediate surrounds appear to be in a mixture of pasture and scrub.

1974 Aerial

The 1974 aerial shows that the north-eastern portion of the site is in horticultural use, possibly orchard. The north-western portion of the site is occupied by a residential dwelling and pasture, while the southern portion of the site is in pasture.

1984 Aerial

The 1984 aerial shows similar features to the 1974 aerial, with horticultural activity still visible, other than the existing house has had an extension added on to its eastern side. This appears to be a large double garage. There is also a new building located in the south-western corner of the site.

1995 Aerial

The 1995 aerial shows that the horticultural activity is no longer present. Other features are similar to the 1984 aerial.

2015 Aerial

The 2015 aerial shows similar features to 1995 and other aerials on Google Earth over the period 2009-2015, other than significant tree growth since 1995.

Review of the available historical aerials for the area shows that part of the site was used for horticultural activities over at least the period 1974-84, possibly orchard, with this activity having ceased prior to 1995.

5.4 COUNCIL RECORDS

5.4.1 Canterbury Regional Council LLUR

A contaminated site enquiry was sent to Canterbury Regional Council in June 2016 for information on the subject site held on their Listed Land Use Register (LLUR). This enquiry confirmed that the site might have been exposed to HAIL activities:

- A10 – Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds over the period 1962-1974, based on review of historical aerial photographs over that period.

The LLUR statement for this site is included in Appendix F.

5.4.2 Selwyn District Council (SDC) Property File

The SDC property files records for the site mostly contained building consents and records of compliance inspections for the buildings located on the subject site, none of which are relevant to this investigation which focused on the former horticultural area.

5.5 SITE WALKOVER RESULTS

A site walkover was conducted on 22 June 2016. It is understood the dwelling at the subject site was constructed in the early 1970s. A garage was located adjacent to the existing dwelling. A small shed and lean to detached structures were also located at the subject site.

The existing HAIL identified area appears to have been converted into garden/paddock areas, currently mostly overgrown with grass. The area had occasional use for grazing a small number of sheep and goats, as indicated by the owner.

A small oil leak (0.5x0.5m^2 area) located adjacent to the existing garage was indicated to us by the owner. Apart from this, no evidence of any significant soil contamination was evident during the site walkover.

The existing buildings on site were not checked for asbestos.

5.6 DATA QUALITY OBJECTIVES & CONCEPTUAL SITE MODEL

In accordance with MfE Contaminated Land Management Guidelines (CLMG) No 5 the Data Quality Objectives (DQOs) and Conceptual Site Model (CSM) for this investigation are summarized in Table 2 below.

Table 2: DQOs and CSM

Purpose of Investigation	Assess human health risks associated with the historic horticultural activity.	
Define boundaries	Investigation focused on the proposed development area. The investigation is based on known/available site history information.	
Develop Conceptual Site Model	Known/possible HAIL land use	A10 – Persistent pesticide use
	Contaminants of concern	Arsenic, Cooper, Lead and Organochlorine pesticides
	Distribution of contaminants	Lateral – across the site Vertical – depending on the soil type
	Receptors	Residents (long term) and construction workers (short term)
	Potential pathways	Dermal contact, ingestion, dust inhalation, produce consumption
	Applicable land use scenario	Recreation
Additional information required (Sampling and Analysis Plan)	Nine (9) sampling locations selected. 18 samples collected in total – 9 shallow and 9 deeper samples. Only the 9 shallow samples were tested.	

6.0 INTRUSIVE SOIL SAMPLING

6.1 RATIONALE

Intrusive soil sampling was conducted of the subject area based on the findings of the desktop study to:

- Check the nature of the soils (visual observation, soil sampling) underneath the site.
- Confirm that HAIL activities were carried out on site.
- Determine the nature and severity of contamination (if any) in the soil.

6.2 EVALUATION BASIS

The sampling results have been compared with the NESCS Soil Contaminant Standards (SCS) for residential land use with 10% produce consumption.

6.3 METHODOLOGY

On 22 June 2016, 18 soil samples were collected using a hand auger. The soil samples were collected from the historical horticultural area. In particular:

- 9 shallow samples (0-150mm depth) described as topsoil/sandy silt with rootlets, dark brown, low plasticity and moist. Samples 1s to 9s.
- 9 deeper samples (150-300mm depth) described as sandy silt, dark brown, low plasticity, moist. Samples 1d to 9d.

Shallow samples (1s to 9s) were analysed for arsenic, copper, lead and OCPs. Compositing was applied for OCP testing in order to reduce the number of analyses required. The deeper samples were not analysed.

The soil sampling methodology is summarised in the table below.

Table 3: Summary of Sampling Methodology

Sample ID	Sampling Depth (mm)	Soil Type	Analysis	
1s	0 –150	Topsoil, sandy silt	As, Cu, Pb	
2s	0 –150	Topsoil, sandy silt	As, Cu, Pb	OCPs
3s	0 –150	Topsoil, sandy silt	As, Cu, Pb	
4s	0 –150	Topsoil, sandy silt	As, Cu, Pb	
5s	0 –150	Topsoil, sandy silt	As, Cu, Pb	OCPs
6s	0 –150	Topsoil, sandy silt	As, Cu, Pb	
7s	0 –150	Topsoil, sandy silt	As, Cu, Pb	
8s	0 –150	Topsoil, sandy silt	As, Cu, Pb	OCPs
9s	0 –150	Topsoil, sandy silt	As, Cu, Pb	

The sampling locations are shown on FTL drawing 32437/01 appended to this report.

6.4 RESULTS SUMMARY

The soil sampling results are summarised in the table below.

Table 4: Summary of Sampling Results

Analytes	Guidelines			1s	2s	3s	4s	5s	6s	7s	8s	9s	Composite 1s,2s,3s	Composite 4s,5s,6s	Composite 7s,8s,9s
Heavy Metals	NES R[1]	Background[2]	Disposal - CleanFill (Burwood)												
Arsenic	20	6.2	80	3	8	3	3	3	4	3	3	3	--	--	--
Copper	>10,000	15	<10,000	4	15	4	9	4	3	4	4	5	--	--	--
Lead	210	23	880	16.7	30	15.7	16.4	23	14.5	14.7	14.6	16.6	--	--	--
OCPs				--	--	--	--	--	--	--	--	--	<LOR	<LOR	<LOR

Note:

Concentrations expressed in mg/kg

1. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Table B2 Soil contaminant standards - $SCS_{(health)}$ - Residential - 10% produce consumption

2. Environment Canterbury - Background Concentrations of selected trace elements in Canterbury - Table 2 - Soil type: "Yellow brown stony" - Level 2 concentrations

3. Disposal site Acceptance criteria as Cleanfill (Burwood)

<LOR Lower than Limit of Reporting

	Exceed background
	Exceed NESCS

The laboratory certificates are shown in Appendix D.

7.0 DISCUSSION AND CONSENTING REQUIREMENTS

The subject site is currently listed under the ECan LLUR as potentially contaminated due to possible exposure to persistent pesticide use associated with horticultural activities during the period of time 1962-1974. These activities fall within the Hazardous Activities & Industries List (HAIL) of the NESCS. In particular these activities are listed as:

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

The desktop information has confirmed that part of the subject site was subject to horticultural activity (possibly orchard) over at least the period 1974-84 and possibly as far back as 1962 based on the LLUR record, with horticultural activity having ceased prior to 1990.

Soil sampling from this area found:

- Arsenic, copper and lead concentrations were present at or below background levels, except in one sample, 2s, where they were slightly above background levels, but well below NESCS residential 10% produce consumption criteria.
- OCPs were below the laboratory limit of reporting.

Four of the samples (6s-9s) were collected from the area which was ploughed in 1998, involving turning over the soil to approximately 0.5m depth. The sampling results from this area are similar to the other sampling results.

Overall, the NESCS regulations are considered not to apply to the identified horticultural area under Regulation 5 (9), as the soil sampling results are considered representative of background levels, including allowing for the 2s sample. Hence, residential development can be undertaken within this area, without being subject to the NESCS.

Any excess soil from site development earthworks can be retained on site or disposed of off-site as cleanfill (e.g. Burwood), subject to compliance with the acceptance criteria of the disposal facility.

However, if any visually stained or odorous soil is encountered during site development, works should stop in this area and Fraser Thomas should be advised immediately. Fraser Thomas would then inspect the relevant area and advise appropriate further investigation and/or remedial actions.

8.0 CONCLUSIONS AND RECOMMENDATIONS

In summary, based on the information presented in this report, the site is suitable for the proposed residential development.

This investigation has found that concentrations of contaminants in soil comfortably meet the applicable NESCS guidelines (residential, 10% produce consumption) and are representative of background levels. Hence, the NESCS does not apply under Regulation 5 (9).

Based on this and on the discussion presented above there do not appear to be any contamination issues at the subject site that might present an unacceptable risk to the health of both current and future occupants. Likewise there does not appear to be any unacceptable risks to the health of construction workers during site development works. Hence, it is highly unlikely that there will be a risk to human health from contaminants in soil from the proposed residential development.

9.0 LIMITATIONS

We have performed our services for this project in accordance with current professional standards for an assessment of the nature and extent of any soil contamination on-site, based upon preliminary site assessment investigations and current regulatory standards for site contamination. The scope of the site assessment activities was generally in accordance with the Ministry for Environment Contaminated Land Management Guideline's (Parts 1 (2003), 2 (2003) and 5 (2004)) and the NES (2011). Conclusions on actual or potential contamination cannot be applied to areas outside of the site investigation.

Limited sampling was undertaken as part of this investigation. We do not assume any liability for misrepresentation or items not visible, accessible or present at the subject site during the time of the site inspection.

 The professional opinion expressed herein has been prepared solely for, and is furnished to Canterbury Regional Council and our client, D Hayward, on the express condition that it will only be used for the works and the purpose for which it is intended.

No liability is accepted by this firm or by any principal, or director, or any servant or agent of this firm, in respect of its use by any other person, and any other person who relies upon any matter contained in this report does so entirely at its own risk. This disclaimer shall apply notwithstanding that this report may be made available to any person by any person in connection with any application for permission or approval, or pursuant to any requirement of law.

Figures and Drawings

0 5 10 15 20 25 50

Scale 1:750

Analytes	Guidelines			1s	2s	3s	4s	5s	6s	7s	8s	9s	Composite 1s,2s,3s	Composite 4s,5s,6s	Composite 7s,8s,9s
	NES R[1]	Background[2]	Disposal - CleanFill (Burwood)												
Heavy Metals															
Arsenic	20	6.2	80	3	8	3	3	3	4	3	3	3	--	--	--
Copper	>10,000	15	<10,000	4	15	4	9	4	3	4	4	5	--	--	--
Lead	210	23	880	16.7	30	15.7	16.4	23	14.5	14.7	14.6	16.6	--	--	--
OCPs				--	--	--	--	--	--	--	--	--	<LOR	<LOR	<LOR

Note:

Concentrations expressed in mg/kg

Exceed background

Exceed NESCS

1. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Table B2 Soil contaminant standards - $SCS_{(health)}$ - Residential - 10% produce consumption

2. Environment Canterbury - Background Concentrations of selected trace elements in Canterbury - Table 2 - Soil type: "Yellow brown stony" - Level 2 concentrations

3. Disposal site Acceptance criteria as Cleanfill (Burwood)

<LOR Lower than Limit of Reporting

SURVEYED			APPROVED DATE
DESIGNED			
DRAWN	DB	07/16	
CAD	DB	07/16	
CHECKED			

REVISION	CHANGES	CHECKED	DATE

NOTES

CLIENT

DAVID HAYWOOD

PROJECT

999 GOULDS ROAD
ROLLESTON

TITLE

SAMPLING &
RESULTS PLAN

Fraser Thomas
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SCALE 1:750 (A3)

DRAWING No 32437/01 REVISION

SHEET 1 of 1

Appendix A

Ministry for the Environment Contaminated Site Report Checklist

D HAYWOOD
DETAILED SITE INVESTIGATION REPORT - CONTAMINATION
999 GOULDS ROAD, ROLLESTON

Report sections and information to be presented	**PSI**	**DSI**	**RAP**	**SVR**	**MMP**	**Notes**
Executive summary	R ☑	R ☑	R ☐	R ☐	R ☐	
Scope of work	R ☑	R ☑	R ☐	R ☐	R ☐	
Site identification	R ☑	R ☑	R ☐	R ☐	R ☐	
Site history	R ☑	S ☑	S ☐	S ☐	S ☐	
Site condition and surrounding environment	R ☑	S ☑	S ☐	S ☐	S ☐	
Geology and hydrology	A ☑	R ☑	S ☐	S ☐	S ☐	
Sampling and analysis plan and sampling methodology	A ☑	R ☑	X	R ☐	R ☐	
Field quality assurance and quality control (QA/QC)	N ☑	R ☑	X	R ☐	S ☐	
Laboratory QA/QC	N ☑	R ☑	X	R ☐	X	
QA/QC data evaluation	N ☑	R ☑	R ☐	R ☐	X	
Basis for guideline values	R ☑	R ☑	R ☐	R ☐	R ☐	
Results	A ☑	R ☑	R ☐	R ☐	S ☐	
Site Characterisation	R ☑	R ☑	R ☐	R ☐	R ☐	
Remedial actions	X	X	R ☐	S ☐	S ☐	
Validation	X	X	X	R ☐	S ☐	
Site management plan	X	X	R ☐	S ☐	S ☐	
Ongoing monitoring	X	X	X	N ☐	R ☐	
Conclusions and recommendations	R ☑	R ☑	R ☐	R ☐	R ☐	

KEY:

1. PSI = preliminary site inspection report
   DSI = detailed site investigation report
   RAP = site remedial action plan
   SVR = site validation report
   MMP = ongoing monitoring and management plan
2. R = corresponding details required
   A = readily available information should be included;
   S = summary of this section's details is adequate if detailed information has been included in an available referenced report;
   N = include only if no further site investigation is to be undertaken;
   X = not applicable and may be omitted.
3. No duplicate samples taken due to small scale of this investigation.

Appendix B

Aerial Photographs

canterbury maps

1942

N

0 0.055 0.11 0.165 0.22 km

Scale: 1:4,630 @A4

Map Created by Canterbury Maps on 2:04:26 p.m.


1974

canterbury maps

1984

N

0 0.01 0.02 0.03 0.04 km

Scale: 1:1,157 @A4

Map Created by Canterbury Maps on 2:06:09 p.m.

canterbury maps

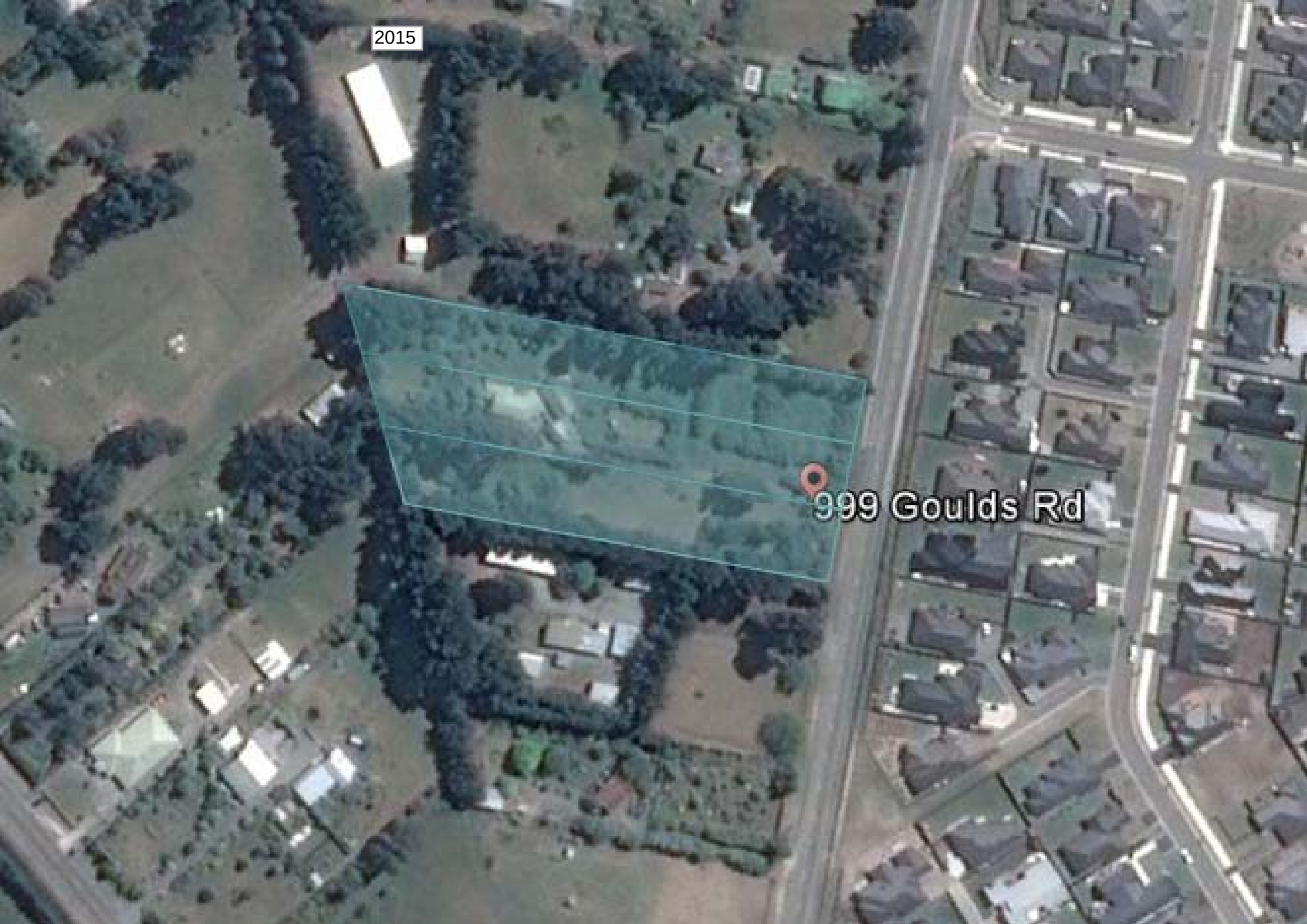
1995

N

0 0.025 0.05 0.075 0.1 km

Scale: 1:2,315 @A4

Map Created by Canterbury Maps on 2:33:30 p.m.


2015
999 Goulds Rd

Appendix C

Site Walkover Photographs

Appendix C: Site Photographs

Photo 1: Existing garage and oil leak from tractor

Photo 2: Garden area, south-western part of the site

Photo 3: Paddock area, looking towards garden area and south-western part of the site

Photo 4: Paddock area, looking towards existing garage, north-western part of the site

Photo 5: Paddock area, looking towards Goulds Road, north-eastern part of the site

Photo 6: Paddock area, looking towards the existing driveway and south-eastern part of the site

Photo 7: Driveway and paddock area, south-eastern part of the site

Appendix D

Laboratory Results & Transcripts

Hill Laboratories
BETTER TESTING BETTER RESULTS

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Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	Fraser Thomas Limited	**Lab No:**	1604362	SPv1
Contact:	E Mondo	**Date Registered:**	23-Jun-2016	
	C/- Fraser Thomas Limited	**Date Reported:**	30-Jun-2016	
	PO Box 23273	**Quote No:**	78277	
	Papatoetoe	**Order No:**		
	Auckland 2155	**Client Reference:**	32437	
		Submitted By:	E Mondo	

Sample Type: Soil

Sample Name:		1s 22-Jun-2016	2s 22-Jun-2016	3s 22-Jun-2016	4s 22-Jun-2016	5s 22-Jun-2016
Lab Number:		1604362.1	1604362.2	1604362.3	1604362.4	1604362.5
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	3	8	3	3	3
Total Recoverable Copper	mg/kg dry wt	4	15	4	9	4
Total Recoverable Lead	mg/kg dry wt	16.7	30	15.7	16.4	23

Sample Name:		7s 22-Jun-2016	8s 22-Jun-2016	9s 22-Jun-2016	6s 22-Jun-2016	Composite of 1s, 2s & 3s
Lab Number:		1604362.6	1604362.7	1604362.8	1604362.16	1604362.17
Individual Tests						
Total Recoverable Arsenic	mg/kg dry wt	3	3	3	4	-
Total Recoverable Copper	mg/kg dry wt	4	4	5	3	-
Total Recoverable Lead	mg/kg dry wt	14.7	14.6	16.6	14.5	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	-	< 0.010
alpha-BHC	mg/kg dry wt	-	-	-	-	< 0.010
beta-BHC	mg/kg dry wt	-	-	-	-	< 0.010
delta-BHC	mg/kg dry wt	-	-	-	-	< 0.010
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	-	< 0.010
cis-Chlordane	mg/kg dry wt	-	-	-	-	< 0.010
trans-Chlordane	mg/kg dry wt	-	-	-	-	< 0.010
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	-	-	< 0.04
2,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.010
4,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.010
2,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.010
4,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.010
2,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.010
4,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.010
Total DDT Isomers	mg/kg dry wt	-	-	-	-	< 0.06
Dieldrin	mg/kg dry wt	-	-	-	-	< 0.010
Endosulfan I	mg/kg dry wt	-	-	-	-	< 0.010
Endosulfan II	mg/kg dry wt	-	-	-	-	< 0.010
Endosulfan sulphate	mg/kg dry wt	-	-	-	-	< 0.010
Endrin	mg/kg dry wt	-	-	-	-	< 0.010
Endrin aldehyde	mg/kg dry wt	-	-	-	-	< 0.010
Endrin ketone	mg/kg dry wt	-	-	-	-	< 0.010
Heptachlor	mg/kg dry wt	-	-	-	-	< 0.010
Heptachlor epoxide	mg/kg dry wt	-	-	-	-	< 0.010
Hexachlorobenzene	mg/kg dry wt	-	-	-	-	< 0.010
Methoxychlor	mg/kg dry wt	-	-	-	-	< 0.010

Sample Type: Soil						
Sample Name:		Composite of 4s, 5s & 6s	Composite of 7s, 8s & 9s			
Lab Number:		1604362.18	1604362.19			
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-
alpha-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
beta-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
delta-BHC	mg/kg dry wt	< 0.010	< 0.010	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	< 0.010	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.010	< 0.010	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.04	< 0.04	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.010	< 0.010	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.010	< 0.010	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.010	< 0.010	-	-	-
4,4'-DDE	mg/kg dry wt	< 0.010	< 0.010	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.010	< 0.010	-	-	-
4,4'-DDT	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Total DDT Isomers	mg/kg dry wt	< 0.06	< 0.06	-	-	-
Dieldrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endosulfan I	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endosulfan II	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endrin	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Endrin ketone	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Heptachlor	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.010	< 0.010	-	-	-
Methoxychlor	mg/kg dry wt	< 0.010	< 0.010	-	-	-

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 clean 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.

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
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%.	-	1-8, 16
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082).. Tested on dried sample	0.010 - 0.06 mg/kg dry wt	17-19
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-8, 16
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	1-8, 16
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	1-8, 16
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	1-8, 16
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	1-8, 16

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

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Peter Robinson MSc (Hons), PhD, FNZIC
Client Services Manager - Environmental

Appendix E

QA/QC

Item	Description
Field Quality Assurance	
Sampling Team Details	Simon Reeves and Georgie Willmer, Geotechnical Engineers, FTL
Intended duplicate/blank frequency	None – due to small scale of investigation.
Sample Records	• FTL chain of custody forms. • Sample locations shown in drawing 32418/01. • Site observations and weather conditions stated in main report.
Chain of Custody	• FTL/RJ Hill Laboratories standard forms. • Directly taken to lab by FTL
Other	• Cleaning of sampling equipment.
Laboratory QA/QC	
Chain of custody	• See attached forms.
Analytical methods and detection limits	• See Appendix D (RJ Hill Laboratories transcripts).
QA/QC Data evaluation	
General	Not done, due to the small scale of investigation.

Appendix F

Listed Land Use Register Statement

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information.
For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

Property Statement
from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

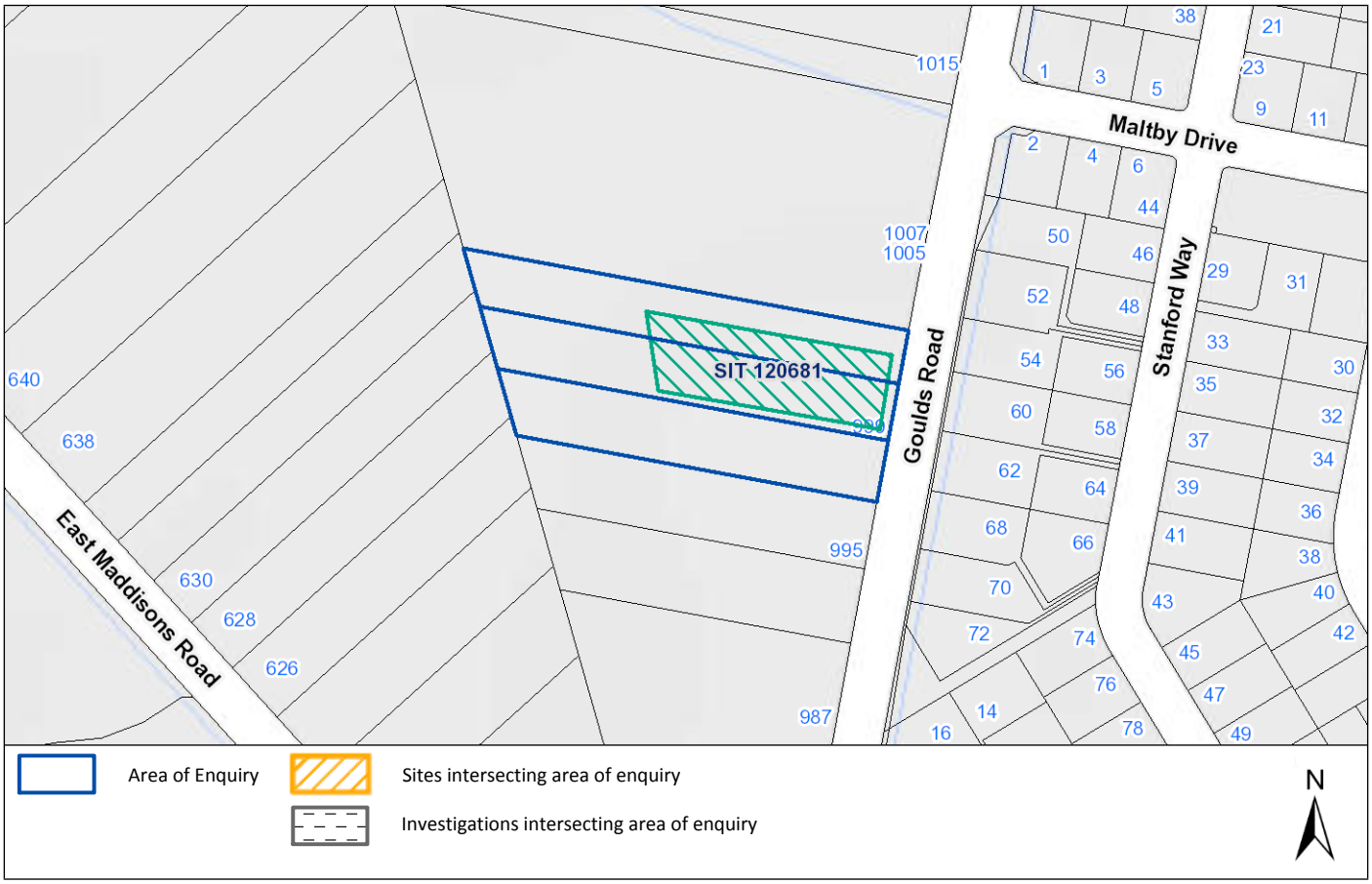
Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828
F. 03 365 3194
E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Date:	14 June 2016	
Land Parcels:	Lot 19 DP 7589	Valuation No(s): 2405521600
	Lot 20 DP 7589	Valuation No(s): 2405521600
	Lot 21 DP 7589	Valuation No(s): 2405521600



The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
120681	999 Goulds Road, Rolleston	999 Goulds Road, Rolleston	A10 - Persistent pesticide bulk storage or use;	HAIL ID Project UNVERIFIED

Please note that the above table represents a summary of sites and HAILs intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site 120681: 999 Goulds Road, Rolleston (Within -1m of enquiry area.)

Site Address:	999 Goulds Road, Rolleston

Legal Description(s):	Lot 19 DP 7589,Lot 20 DP 7589

Site Category:	HAIL ID Project UNVERIFIED
Definition:	Environment Canterbury has identified the potential for this site to have accommodated a HAIL activity. However, this information has not been verified as correct.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
1962	1974	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

8 Jan 2016	This record was created as part of the Selwyn District Council 2015 HAIL identification project.
8 Jan 2016	Area defined from 1962 to 1974 aerial photographs. Horticultural activities (persistent pesticides) were noted in aerial photographs reviewed.

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number ENQ132798.