Appendix D –ENGEO, Preliminary Site Investigation, Soil Contamination

ENGEO

Celebrating 10 YEARS IN NZ

Combined Preliminary and Detailed Environmental Site Investigation

174 Hamptons Road

Prebbleton

Submitted to:

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1 Introduction

ENGEO Ltd was requested by Urban Estates Limited to undertake a combined preliminary and detailed environmental site investigation of the property at 174 Hamptons Road, Prebbleton, (herein referred to as 'the site'). Figure 1 attached indicates the location of the property. ENGEO understands that the site is to undergo a plan change for residential land use, with eventual residential subdivision which will likely involve soil disturbance and require information on the suitability of the site and soil quality.

This PSI / DSI was completed in order to satisfy Selwyn District Council (SDC) requirements in relation to the plan change assessment and for potential future subdivision requirements in accordance with the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES).

This investigation was undertaken in general accordance with the MfE 2011, *Contaminated Land Management Guidelines (CLMG) No.5: Guidelines for Site Investigation and Site Analysis of Soil* and reported in general accordance with the MfE 2011 *CLMG No.1: Reporting on Contaminated Sites in New Zealand*.

1.1 Objectives of the Assessment

The objective of this Combined PSI / DSI was to assess conditions indicative of releases and threatened releases of hazardous substances on, at, in or to the subject property and report on the potential risk posed to future site users.

1.2 Approach

To satisfy the objectives, ENGEO sought to gather information regarding the following:

- Current and past property uses and occupancies;
- Current and past uses of hazardous substances;
- Waste management and disposal activities that could have caused a release or threatened release of hazardous substances;
- Current and past corrective actions and response activities to address past and on-going releases of hazardous substances at the subject property; and
- Properties adjoining or located near the subject property that have environmental conditions that could have resulted in conditions indicative of releases or threatened releases of hazardous substances to the subject property.

1.2.1 Review of Site Information

During this assessment, a number of sources of information were contacted for information relating to the site regarding its past and present uses. This included contacting Canterbury Regional Council (CRC) to determine if there were records on the Listed Land Use Register (LLUR), reviewing records held by Selwyn District Council (SDC) including the property file, and obtaining the certificate of titles for the property from Land Information New Zealand (LINZ). A review of a number of historical and current aerial photographs was also undertaken using images from Canterbury Maps and Google Earth.

1.2.2 Site Inspection

A site walkover was undertaken on 27 August 2020 by ENGEO.

2 Site Description and Setting

Site information is summarised in Table 1.

Table 1: Site Information

Item	Description
Location	174 Hamptons Road, Prebbleton
Legal Description	LOT 2 DP 366875 BLK XIII CHRISTCHURCH SD
Site Area	5.34 ha
Property Owner	Urban Estates Limited
Current Land Use	Residential and Horticultural – glasshouses growing asparagus and flowers.
Proposed Land Use	Standard residential subdivision, for single dwelling sites with gardens, including home-grown produce consumption (10%).
Building Construction	Main Dwelling: Concrete ring foundation, timber cladding and joinery and a metal roof. Garage to west of dwelling: Open earth ground, timber framing, metal cladding and roof. Garage to north of the dwelling: Concrete floor, brick and metal cladding, metal roof. Portacom: Timber piles, metal cladding and roof. Multiple glasshouses: Open earth floor, timber and metal joinery.
Territorial Authority	Selwyn District Council
Zoning	Inner Plains

The site setting is summarised in Table 2.

Table 2: Site Setting

Item	Description
Topography	The site is predominately flat.
Local Setting	The sites to the north, south and west are life style residential blocks and the sites to the east are part of a residential subdivision.
Nearest Surface Water & Use	An un-named drain runs northwest to southeast along the south-western boundary line of the site, parallel to Hamptons Road. The drain is presumed to be used for stormwater runoff. The drain was flowing, clear with no sheens on the water surface.
Geology (GNS Science)	Late Quaternary unconsolidated to poorly consolidated mud, sand, gravel and peat of alluvial and colluvial origin.
Hydrogeology (ECan GIS)	The site is located over an unconfined / semiconfined gravel aquifer. The well on-site logged initial water depth at 9.0 m below ground level and is presumed to flow in a general south-easterly direction to Lake Ellesmere.
Groundwater Abstractions (ECan GIS)	There is one groundwater abstraction located on the site and three within 250 m of the site: M36/3109: MP Soper, active well (18.0 m) on site for domestic and stockwater use. M36/5284: GJ Doob, active well (29.80 m) to the west of the site for domestic supply. M36/4871: AG & J Marshall, active well (30.0 m) to the west of the site for domestic and stockwater use. M36/5379: CD and CA White, active well (30.0 m) to the south of the site for domestic supply.
Discharge Consents (ECan GIS)	There are no active discharge consents located on the site, and three active consents within 250 m of the site: CRC072413: Canterbury Trustees Limited, active discharge consent for discharge wastewater contaminants to land to the west of the site. CRC053365: JD and MF Collings, active discharge consent for the discharge of domestic sewage tank effluent to ground. CRC053663: K Shadwell, active discharge consent for the discharge of domestic sewage tank effluent to ground.

3 Site History

A number of sources were used to investigate the past uses of the site. The findings of these information searches have been summarised in this section.

3.1 Listed Land Use Register (LLUR)

Potentially hazardous activities are defined on the Ministry for the Environmental (MfE) Hazardous Activities and Industries List (HAIL). Canterbury Regional Council (CRC) maintains a Listed Land Use Register (LLUR) of past and current land uses within the Canterbury region which have potentially had an activity included on the HAIL undertaken on them. Under the NES, the listing of the property on the LLUR triggers the requirement for a contaminated land assessment prior to development.

The CRC LLUR property statement was requested by ENGEO on 21 August 2020 for the site and is presented in Appendix 2.

Table 3: LLUR Summary

Period From	Period To	HAIL Activity(s)	LLUR Category
1984	Present	A10: Persistent pesticide bulk storage or use	Not Investigated
Additional Information		Area defined during 2015 HAIL identification project. Vegetable construction, glasshouses. BPs for glasshouses Mar 1979 – Dec 1981. First tomato crop grown 1979, rest of 9.7959 ha property used for cropping – part of it in courgettes in 1979. 2004: glasshouses and small flower growing business. Area defined from 1994 to present aerial photographs. Horticultural activities (persistent pesticides) were not in aerial photograph reviewed.	

Note: ENGEO understands that the courgettes noted above were grown in the glasshouses and the remainder of the site was cropped for bailage and feed for stock, not horticultural.

3.2 Discussions with Site Owners

A discussion was held between ENGEO and the previous site owner on 27 August 2020. The previous owner had owned the site since the 1980's. The previous site owner stated that the courgettes noted on the LLUR statement were grown in the glasshouses and the paddocks were only ever used for cropping for stock feed. The owner stated that the loading pen towards the northeast of the glasshouses was never used for drenching or spraying stock, only for loading. The owner stated that some of the small structures on-site were previous pigsties which were moved from another part of the site.

3.3 Selwyn District Council Property File

The property file for the site, held by Selwyn District Council, was reviewed as part of the DSI:

- 15 November 1981 – Building permit for 259.2 m^2 glasshouse.
- 27 July 1982 – Building permit for 81 m^2 storage shed.
- 12 February 1982 – Building permit to install a free standing heating unit.

The property file information did not include asbestos containing materials being used in the construction of the buildings. Because of the age of the buildings (constructed pre-2000) a full asbestos demolition survey is required prior to demolition; this is to ensure that asbestos materials are identified prior to demolition works so that they can be removed in a safe manner.

3.4 Certificate of Title

A review of the certificate of title was completed with no information related to potential contaminating activities identified. The Certificates of Title are attached in Appendix 3.

3.5 Historical Aerial Photograph Review

Aerial photographs dating from 1940 to 2018 have been reviewed. The relevant visible features are summarised in Table 4.

Table 4: Aerial Photographs

Date	Source	Description
1940-1944	A residential dwelling is observed towards the south-eastern corner of the site with visible planting around the dwelling. A structure is visible to the northeast of the dwelling (potential shed or barn). The remainder of the site appears to be grassed and may be a part of a larger paddock area. The surrounding area is undeveloped and appears to be used for grazing. A quarry is present approximately 200 m to the east of the site off Springs Road.	
1955-1959	The dwelling is still visible in the south-eastern corner of the site. Another outbuilding is visible to the north of the dwelling. The barn/shed is still present to the northeast of the dwelling. The remainder of the site is still grassed. The surrounding area remains mainly unchanged from the previous aerial photograph.	

1960-1964	There are no visible changes from the previous aerial photograph.	
1970-1974	Dwelling is still present and vegetation around dwelling has matured. The large shed/barn building has been removed from site. A small rectangular shed has been constructed to the north of the dwelling just past the tree line – approximately 20 m north. Six smaller sheds or structures are also present at the end of the driveway area. An area of land disturbance or bare ground is visible to the northwest of the dwelling near the boundary line. The remainder of the site is undeveloped and grassed. Dwellings have been constructed along Hamptons Road at 190 and 192 as well as to the southeast (no address as site has been subdivided). A trotting track is present on the site to the east.	

1980-1984	A barn structure has been constructed at the end of the driveway to the west. Some of the smaller structures from this area have either been moved or removed. A glass house is visible approximately 60 m to the north of the dwelling. Smaller sheds are visible between the barn to the north of the dwelling and the glasshouse. The area of bare land or land disturbance is not visible to the northwest of the dwelling. The remainder of the site appears to still be grassed with tree lines showing distinct paddock areas. The surrounding sites are mainly unchanged. The paddock at 182 Hamptons Road has been cropped and a small area of tree planting is visible along the north boundary line at 190 Hamptons Road.	
1990-1994	Additional vegetation is visible to the southwest of the dwelling. Small structures are now clearly visible to the east of the glasshouse. A structure is also visible to the east of the glasshouses near the tree line for the paddock to the north – it is unclear what this structure is. The remainder of the site is mainly unchanged. The surrounding area remains mainly unchanged from the previous aerial photograph.	

2000-2004	The site and surrounding area remains mainly unchanged from the previous aerial photograph. However, the photograph is of bad quality, so any small changes are not observed.	
2010-2015	A tennis court has been constructed to the southwest of the dwelling. A barn structure with two shipping containers is visible to the west of the driveway. Another barn is visible to the east of the driveway. Another structure is also visible in this area (portocom). Three small sheds are visible to the southeast of the glasshouse. Two small glasshouses are visible to the east of the large glasshouse. A loading pen is visible to the northeast of the two small glasshouses. An area of burning is visible to the west of the large glasshouse in an empty paddock. The northern paddocks are grassed and appear to be used for grazing. Two dwellings have been constructed on-site at 182 Hamptons Road. The remainder of the surrounding area was mainly unchanged.	

2017	There are no visible changes to the site from the previous aerial photograph. The sites to the east of the site along Farthing Drive are undergoing earthworks for the subdivision. The remainder of the surrounding area was mainly unchanged.	

Table 5 below describes the site conditions during the site walkover on 27 August 2020. Photographs taken during the site walkover are included in Appendix 1.

Table 5: Current Site Conditions

Site Conditions	Comments
Visible signs of contamination	A burn pile approximately 4 x 4 m in size was observed in the paddock to the west of the glasshouse. Nails, metal and organic materials were observed in the material.
Surface water appearance	The stream running along Hamptons Road was clear and flowing. There were no sheens in the water.
Currently surrounding land use	The sites to the north, south and west are all lifestyle blocks with dwellings and agricultural grazing. The sites to the east are a part of a residential subdivision.
Local sensitive environments	The stream running along the south-western boundary line of the site.
Visible signs of plant stress	No visible signs of plant stress were noted on-site.
Additional observations	A large glasshouse split into two sections was observed on the site. One glasshouse was growing flowers and the other asparagus. Two smaller glasshouses were observed to the east of the large glasshouse which were empty. A small shed was observed to the south of the glasshouse. The shed contained small containers of fertiliser and sprays for the glasshouses. The shed had a timber floor which did not appear stained. A small shed was observed to the northwest of the dwelling. The shed contained small amounts of paint on timber shelving. No staining was visible on the timber floor.

4 Potential HAIL Activities

Activities included on the Hazardous Activities and Industries List (HAIL) trigger the requirement for a contaminated land investigation prior to redevelopment. Following the site walkover and review of the desktop information, it is considered that the following HAIL activities are or have been present at the site.

Table 6: Potential HAIL Activities

Potential Source of Contamination	Contaminants of Concern	Possible Extent of Contamination	HAIL Activity as defined by the NES
Glasshouses	Heavy metals Organochlorine pesticides (OCPs)	Area within glasshouses and around storage sheds	A10. Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
Burn pile	Heavy metals Polycyclic aromatic hydrocarbons	Area directly around the burn pile	G5: Waste disposal to land
Deteriorated lead based paint and / or asbestos Dwelling and previous structures	Lead Asbestos	Area around dwelling and around former small sheds/structures	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

5 Intrusive Investigation

Potential contamination on-site as a result of historical pesticide application is likely limited to shallow soils. An intrusive investigation was developed to investigate the upper 0.3 meters below ground level (m bgl).

The soils were sampled to assess the suitability of the land (from a contamination / human health perspective) for residential use, and to assess the human health risks posed to site works under the commercial / outdoor worker scenario. The results can also be used to indicate whether there is a likely impact to the surrounding environment.

5.1 Methodology

The following was undertaken during the soil sampling works:

- Collection of eight (S1-S8) discrete soil samples from 0.0-0.3 m depth from areas within the glasshouses and directly adjacent to a storage shed of chemicals. These samples were analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc) and OCPs;
- Collection of three initial soil samples (S9-S11) from around an area of previous small structures or sheds with analysis for lead and asbestos semi-quantitative analysis;
- Collection for four delineation samples from around an identified hotspot (S9) with the four samples analysed for lead (S24, S25, S26, S27);
- Collection of one soil sample (S12) from the middle of a burn pile with analysis for heavy metals and polycyclic aromatic hydrocarbons;
- Collection of two initial samples from soils directly adjacent to the dwelling and water tank with analysis for lead (S13 and S14);
- Collection of 12 delineation lead samples from around S13 and S14 for lead analysis. Please refer to Figure 2 for the delineation sample locations;
- Each sample was inspected for visual and olfactory indicators of contamination;
- All soil samples collected were placed in jars, which were then sealed, labelled with a unique identifier and placed in chilled containers (chilly bins) prior to transportation to the laboratory. Samples were transported to RJ Hill Laboratories (Hills – chemical analysis) and Terra Scientific (asbestos analysis) under the standard ENGEO chain of custody documentation provided in Appendix 4;
- To reduce the potential for cross contamination, each sample was collected using disposable nitrile gloves that were discarded following the collection of each sample;
- After collection of each sample, the sampling equipment was decontaminated by scrubbing with a solution of Decon90 and rinsing with tap water followed by deionised water;
- The intrusive sampling was completed in accordance with ENGEO standard operating procedures;
- All fieldwork and sampling was undertaken in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils;
- Following receipt of the samples by Hill Laboratories, the soil samples were scheduled for a selection of contaminants of concern including heavy metals (arsenic, cadmium, chromium, copper, mercury, lead, nickel and zinc) and organochlorine pesticides (OCPs); and
- On receipt of the analytical results, an assessment of the soil concentrations for contaminants of concern with applicable standards and soil acceptance criteria for the protection of human health and the environment was undertaken.

Quality Assurance and Quality Control

The quality assurance / quality control (QA / QC) procedures employed during the works included:

- Standard sample registers and chain of custody records have been kept for all samples;
- The use of Hill Laboratories and Terra Scientific, ISO/IEC 17025 and IANZ accredited laboratory, to conduct all laboratory analysis. To maintain their International Accreditation, Hill Laboratories and Terra undertakes rigorous cross checking and routine duplicate sampling testing to ensure the accuracy of their results;
- Prior to sampling the equipment (hand auger) was decontaminated using a triple wash procedure with potable water, Decon 90 solution and deionised water; and
- During the site investigation every attempt was made to ensure that cross contamination did not occur through the use of the procedures outlined within this document.

6 Regulatory Framework and Assessment Criteria

6.1 Selwyn District Council

In making any plan change application to rezone land for a new residential or business area, certain information is required to accompany the request. The requirements are set in Clause 22 of the First Schedule to the Act.

Clause 22 states:

- *A request made under Clause 21 shall be made to the appropriate local authority in writing and shall explain the purpose of, and reasons for, the proposed plan or change to a policy statement or plan and contain an evaluation report prepared in accordance with section 32 for the proposed plan or change.*
- *Where environmental effects are anticipated, the request shall describe those effects, taking into account clauses 6 and 7 of Schedule 4, in such detail as corresponds with the scale and significance of the actual and potential environmental effects anticipated from the implementation of the change, policy statement, or plan.*

This report will provide an assessment of the site in regards to its suitability for the proposed plan change for applicable information only.

6.2 NES

The NES came into effect on 1 January 2012 (MfE, 2011f).

The NES introduced soil contaminant standards (SCSs) for 12 priority contaminants for the protection of human health under a variety of land use scenarios.

The NES requires the *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values* be used where a NES SCS is not available. The NES does not consider environmental receptors; accordingly, the application of guidelines relevant to environmental receptors shall be implemented according to the MfE CLMG No. 2 and any relevant rules in the Regional Plan.

In addition, local background levels in soil have been referenced to establish consenting implications under the NES and disposal requirements. Background levels for metals in soils in the area were obtained from ECan's online GIS – Trace Level 2 concentrations.

6.3 Disposal Criteria

An assessment of potential off-site disposal options for excess soil generated during site development works has been conducted. Dependent on the condition of the spoil, off-site disposal options range from disposal to "cleanfill" sites to managed fill sites. As outlined in the publication Waste Management Institute of New Zealand Technical Guidelines for Disposal to Land (August 2018) definition of cleanfill which states:

"Virgin excavated natural materials (VENM) such as clay, soil and rock that are free of:

- Combustible, putrescible, degradable or leachable components;
- Hazardous substances or material (such as municipal solid waste) likely to create leachate by means of biological breakdown;
- Products or materials derived from hazardous waste treatment, stabilisation or disposal practices;
- Materials such as medical and veterinary waste, asbestos or radioactive substances that may present a risk to human health if excavated;
- Contaminated soil and other contaminated materials; and
- Liquid waste."

6.4 Assessment Criteria

Contaminant concentrations in soil were compared to human health criteria based on the following land use:

- Residential land use (10% produce); and
- Commercial / industrial land use (based on an outdoor worker scenario) (for redevelopment workers).

The land use scenarios are relevant to the likely future use of the site and are being used as a surrogate to assess short term risks to redevelopment earth workers on-site during the development activities.

The NES methodology document notes that the exposure parameters assumed for the maintenance / excavation scenario in other New Zealand guidelines are unrealistic (perhaps by a factor of ten or more). The technical committee preparing the NES decided that a maintenance / excavation worker scenario should not be included in the NES as sites would not be cleaned up to this standard; it was considered more appropriate that exposures to these workers be limited through the use of site-specific controls that are required under health and safety legislation. However, this report uses commercial / industrial outdoor worker criteria to get a general sense of potential risks to excavation workers during the redevelopment. Note that commercial / industrial outdoor worker criteria are based on personnel carrying out maintenance activities involving soil exposure to surface soil during landscaping activities, and occasional shallow excavation for routine underground service maintenance. Exposure to soil is less intensive than would occur during construction works but occurs over a longer period. For a construction worker developing the site, the soil exposure is limited when compared to a large earthworks project (e.g. for a residential subdivision or industrial development). As such, the commercial / industrial outdoor worker criteria are considered suitable for obtaining a high-level understanding of potential risks to excavation workers during site redevelopment and confirming the need for site controls.

The soil analysis results have also been compared to Regional Background concentrations for heavy metals and OCPs. These provide information into the possible disposal options at a clean-fill facility. These criteria have not been adjusted as the composite sample results provide an indication of the average contaminant concentrations. These provide information into the possible disposal options at a cleanfill facility.

7 Results

7.1 Soil Encountered

Please refer to Table 7 for the summary of subsurface soils encountered in the soil samples. The ENGEO Geotechnical Report (ENGEO, 2020) provides details on the deeper soil profiles.

Table 7: Summary of Subsurface Soils

Depth	Soil Description
0.0-0.2	Silty fine to medium SAND with trace gravel and rootlets; brown. [TOPSOIL].
0.2-0.5	Fine to medium SAND with some silt; light brown with orange mottles.

7.2 Analytical Results

The analytical results from the ENGEO investigation can be summarised as follows:

- Two samples collected from in or around the glasshouses have been reported above the SCS for residential land use for arsenic (S3 and S6). Other samples collected from in and around the glasshouses (S1-S8) have reported arsenic, cadmium, copper, lead and zinc above the site specific regional levels.

- One sample collected from an area of previous sheds / small structures has reported concentrations of lead above the SCS for residential land use (S9). All three samples collected from this area have reported lead above the site specific regional levels. Asbestos semi-quantitative analysis from three samples reported negative for asbestos fines and fibres.
- One sample collected from the burn pile has reported concentrations of arsenic, chromium and lead above the SCS for residential land use. Arsenic was also reported above the commercial / industrial outdoor worker criteria. All heavy metals analysed were reported above the site specific regional levels. Polycyclic aromatic hydrocarbons all returned below the laboratory limit of detection except phenanthrene and naphthalene concentrations which are below the guideline values.
- Seven samples collected from around the dwelling for lead have returned concentrations above the SCS for residential land use. All samples collected for lead around the dwelling were reported above the site specific regional levels.

Please refer to Appendix 4 for the full laboratory certificate and results. Only detectable concentrations of analytes are shown in Table 8, 9 and 10 below.

Table 8: Analytical Results

Analyte	Units	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	Assessment Criteria		
																Background (bl) - Canterbury Regional	Residential - 10% produce	Industrial
Lab Sample ID		**2426843_1**	**2426843_2**	**2426843_3**	**2426843_4**	**2426843_5**	**2426843_6**	**2426843_7**	**2426843_8**	**2426843_9**	**2426843_10**	**2426843_11**	**2426843_12**	**2426843_13**	**2426843_14**			
Soil Depth		**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**			
Sample Date		**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**	**27-08-2020**			
Heavy Metals																		
Total Recoverable Arsenic	mg/kg	10	6	**23**	4	11	**26**	10	**15**	-	-	-	**1730**	-	-	12.58	20 (A)	70 (A)
Total Recoverable Cadmium	mg/kg	**1.03**	**0.25**	**0.34**	< 0.10	**0.30**	**0.26**	0.18	**0.21**	-	-	-	**0.85**	-	-	0.19	3 (A)	1,300 (A)
Total Recoverable Chromium	mg/kg	13	12	16	11	11	14	12	13	-	-	-	**520**	-	-	22.7	460 (A)	6,300 (A)
Total Recoverable Copper	mg/kg	**25**	13	**41**	9	**41**	**31**	**26**	**29**	-	-	-	**1380**	-	-	20.3	10,000 (A)	10,000 (A)
Total Recoverable Lead	mg/kg	**119**	**62**	**105**	17.3	16.6	19.7	25	19.6	**240**	**46**	**157**	**1780**	**2200**	**750**	40.96	210 (A)	3,300 (A)
Total Recoverable Mercury	mg/kg	0.11	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	-	-	-	-	-	-	0.11	310 (A)	4,200 (A)
Total Recoverable Nickel	mg/kg	11	8	8	9	6	8	9	9	-	-	-	**34**	-	-	20.7	400 (B)	6,000 (B)
Total Recoverable Zinc	mg/kg	**1410**	**280**	**240**	53	**171**	**139**	88	90	-	-	-	**2000**	-	-	96.94	7,400 (B)	400,000 (B)
Organochlorine Pesticides																		
Σ DDT	mg/kg	<0.07	<0.08	<0.09	<0.06	<0.07	<0.08	<0.08	<0.08	-	-	-	**-**	-	-	0.431	70	1,000

General Notes:
Cells highlighted red exceed one or more assessment criteria.
This table does not represent the full analytical results, please refer to the laboratory results for full details.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.
Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013), C - Regional Screening Levels Targeted Hazard Quotient 0.1 (US EPA, 2020), D - Identifying, Investigating and Managing Risks Associated with Former Sheep-dip Sites (MfE, 2006), E - Users' Guide to the Guidelines for Assessing and Managing Contaminated Gasworks Sites in New Zealand (MfE, 1997)

Table 9: Lead Delineation Sample Analysis

Analyte	Units	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	Additional Criteria	Assessment Criteria	
														Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Soil Depth		**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**			
Sample Date		**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**	**14-10-2020**			
Heavy Metals																
Lead	mg/kg	**340**	**260**	**370**	**176**	**1,430**	**200**	**1,940**	**112**	**61**	**77**	**152**	**164**	40.96	3,300 (A)	210 (A)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013),

Table 10: Asbestos Analysis Results

Sample Name	Sample Type	Result
S9	Soil	No asbestos detected
S10	Soil	No asbestos detected
S11	Soil	No asbestos detected

8 Conceptual Site Model

A conceptual site model consists of four primary components. For contaminants to present a risk to human health or an environmental receptor, all four components are required to be present and connected. The four components of a conceptual site model are:

- Source of contamination;
- Pathway(s) in which contamination could potentially mobilise along (e.g. vapour or groundwater migration);
- Sensitive receptor(s) which may be exposed to the contaminants; and
- An exposure route, where the sensitive receptor and contaminants come into contact (e.g. ingestion, inhalation, dermal contact).

The potential source, pathway, receptor linkages at this subject site are provided in Table11.

Table 11: Conceptual Site Model

Potential Sources	Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk? So samples meet acceptance criteria?
Glasshouses	Heavy metals and OCPs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers. Future subsurface maintenance workers.	**No,** two samples have returned concentrations above the NES residential guideline criteria for arsenic. Remediation required prior to redevelopment.
Previous structures	Lead Asbestos	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers. Future subsurface maintenance workers.	**No**, a sample have returned concentrations above the NES residential guideline criteria for lead. Remediation required prior to redevelopment.

Potential Sources	Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk? So samples meet acceptance criteria?
Burn pile	Heavy metals Polycyclic aromatic hydrocarbons	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers. Future subsurface maintenance workers.	**No**, a sample have returned concentrations above the NES residential guideline criteria for arsenic, chromium and lead. Remediation required prior to redevelopment.
Deteriorated lead paint on dwelling	Lead	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers. Future subsurface maintenance workers.	**No,** seven samples have returned concentrations above the NES residential guideline criteria for lead. Remediation required prior to redevelopment.

9 Conclusions

An assessment of the site for its suitability for the proposed plan change is required under the Selwyn District Council requirements. During the potential residential subdivision, soil disturbance and removal is likely to occur. ENGEO were requested by Urban Estates to undertake a PSI and soil sampling of identified areas of concern. The soil samples were to assess the concentrations of contaminants of concern at the site, and to provide advice regarding the suitability of the site for the proposed plan change, potential residential subdivision, the health and safety of future redevelopment workers, disposal options, and whether resource consents would be required for the future redevelopment works.

The PSI information collected indicates that the site has been used for mixed purposes which includes agricultural and residential land use, with glasshouses growing various crops and flowers, with these operations having the potential to impact the underlying soils.

The majority of the site was considered unlikely to have had an activity included on the HAIL undertaken on it and is suitable for proposed plan change and residential end use.

During the site walkover, a number of HAIL activities were observed, with these located across the wider site area. The HAIL activities are associated with the former and current uses of the site as a farm and residential site, and are considered to have the potential to have impacted the underlying soils. The HAIL categories included the following:

- A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds;
- G5: Waste disposal to land (excluding where biosolids have been used as soil conditioners); and

- 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 (previous and / or deteriorated buildings).

A targeted intrusive investigation was undertaken to assess if the soil had been impacted by the former and current uses of the site identified during the walkover and desktop review. The investigation comprised the collection of a total of 26 soil samples from the four areas of concern at the site (see Figure 2 and 3 for reference).

The soil samples were submitted to either RJ Hill Laboratories or Terra Scientific, dependent on analysis type, to be analysed for the presence of the identified contaminants of concern. The results from the laboratory analysis indicate the following:

Area 1: Glasshouses and storage sheds

One large glass house, two smaller glasshouses and two storage sheds were observed during the site walkover. The glasshouses had been used for vegetable and flower growing since the 1980's. Soil samples returned arsenic above the Residential land use criteria. Arsenic, cadmium, copper, lead and zinc were observed above the expected regional background levels.

Area 2: Former structures near glasshouses

Historical aerial photographs showed a group of previous buildings or structures to the northwest of the dwelling. One sample was reported for lead above the Residential land use criteria. Lead was also observed above the expected regional background levels.

Area 3: Burn pile

A burn pile with visible contamination other than green waste was observed in the paddock to the west of the glasshouse. Arsenic, chromium and lead were reported above the Residential land use criteria. All heavy metals analysed were also reported above the regional background levels.

Area 4: Deteriorated lead paint around dwelling

As the residential dwelling has been on-site since pre-1940, lead soil samples were collected from around the dwellings footprint. Seven samples were reported in differing locations around the dwelling above the residential land use criteria for lead. Lead was also observed above the expected regional background levels.

Disposal Options

As the soil analysis results were above the regional background levels for the site, material excavated from the areas identified are unlikely to be able to be disposed of at a cleanfill facility unless soil mixing and dilution occurs. It is likely if soils are to be disposed of off-site, they would require disposal to Kate Valley Landfill. However, this should be checked with the landfill operator prior to disposal and additional analysis may be required to be undertaken to determine the suitability for disposal.

Suitability of the Site for Future Residential Subdivision

The desk based research of the site indicated that the majority of the site is highly likely to be suitable for a residential end use as no activities included on the HAIL were identified. During a site walkover a number of potentially contaminative activities were identified and targeted soil sampling undertaken in these areas.

Based on the results taken from the glasshouses, burn pile, previous buildings and the residential dwelling, if future residential land users come into contact with the soil, a complete contaminant exposure pathway is likely to be present and an unacceptable risk to human health would exist. Therefore, in the site's current state, future residential subdivision is likely to be considered a restricted discretionary activity under Regulation 10 of the NES for Assessing and Managing Contaminants in Soil to Protect Human Health.

There are several options available to mitigate the risks to human health and enable the site to be subdivided and used for residential land use. The options available are:

- Excavation and removal from the site of contamination above the human health SCS for the proposed residential land use. This would likely require consent for the disturbance of the 'contaminated site' during remediation. Disposal to off-site landfills should be investigated to confirm the costs associated with this option.
- The placement of a barrier over the existing impacted areas to adequately impact exposure. This could include stabilising, capping and containing the soils exceeding the relevant SCS. If this option is chosen, it is likely that Selwyn District Council would require a long term management plan and discharge consent, and the soils should be placed in areas underneath hardstanding or an appropriate amount of soil.
- Creating an encapsulation cell in an area of the site. Again this option will likely require a number of consents including land disturbance, deposition of contaminated soils to land, and a long term management plan and discharge consent. Additional testing of the contaminated material would also likely be required for the potential leaching of the material.
- Mixing of the contaminated material with other soils from on-site to dilute the concentrations. This option will require additional sampling to be undertaken of the mixed material to determine if dilution was successful. If the mixing is unsuccessful the volume of the impacted material to be managed / removed from site would have increased.

10 Recommendations

ENGEO recommend that a remedial strategy is developed to manage the soil that exceeds the NES for residential land use in the areas of the site identified in this report. The remedial strategy should be formulated in conjunction with the final development plans, including soil removal volumes and locations, and with the District and Regional Councils, so that the most appropriate, cost effective and sustainable approach can be implemented.

Due to the concentrations of the contaminants of concern at the site, a resource consent for land disturbance and removal is not likely to be required during the site works. If a volume of soil exceeding 25 m^3 per 500 m^2 of development area is proposed to be disturbed, or if a volume of soil exceeding 5 m^3 per 500 m^3 of development area per year is proposed to be disposed of off-site, a consent should be obtained according to the requirements of the NES. Whether the work is to be undertaken under a consent or not, a site management plan is required to manage the risks to the on-site workers and the surrounding population and environment. An additional stormwater discharge consent may be required from Canterbury Regional Council for the duration of the redevelopment works on-site.

Information obtained during the investigation indicated that asbestos may be present within the buildings constructed on-site, and an asbestos survey should be carried out on the buildings to assess their condition before any demolition occurs. This will help Urban Estates to meet its obligations under the Health and Safety at Work (Asbestos) 2016 Regulations.

The conclusions and recommendations of this report are limited to the areas / depths of soil sampled. Therefore, there is the potential for unidentified hot spots of contamination to exist at the site. As previously sated, a site management plan (SMP) should outline procedures to identify and mitigate exposure to identified and unidentified contamination, if encountered during the redevelopment works.

10.1 Assessment of Environmental Effects

Based on the requirement of Section 88 of the Resource Management Act (RMA) and the framework set out in the Fourth Schedule of the RMA, the actual and potential effects associated with the proposed works are summarised in Table 12.

The environmental effects of the proposed plan change from rural residential / horticultural / agricultural to residential are expected to have a no more than minor effect on the environment. Whilst elevated concentrations of concern are currently present on-site, following remediation, it is considered that the remaining site would have a less than minor impact on the receiving environment. Overall, it is considered that additional investigations and management controls may be required to address land contamination, but that these are able to be managed through the requirements of the NESCS prior to any redevelopment works occurring and do not preclude the rezoning of the site as proposed.

Table 12: AEE from Redevelopment Works

Schedule Four Item	Assessment of Environmental Effects
Description of the proposal	The site area consisting of 174 Hamptons Road is currently zoned as Inner Plains with the proposal designed to increase the residential density of the site.
Where the activity is likely to result in significant adverse effects, a description of the alternatives	Any actual or potential effects on the environment are likely to be less than minor. The elevated contaminants of concern at the site are not considered to be significant in relation to development works that are anticipated through the rezoning, and can be appropriately managed during redevelopment.
An assessment of the actual potential effects on the environment	Earthworks would be conducted in line with consent conditions in addition to the proposed mitigation measures detailed in the RAP. Potential for removal works to generate minor amounts of dust during the excavation and removal of impacted soil. Mitigation will involve utilising water to suppress dust and covering soil stockpiled on-site as well as all truckloads leaving the site. Potential for stormwater run-off to be contaminated if it encounters the impacted soil. Potential for noise generation from excavators. Contribution of site generated noise is unlikely to be significant and will be completed within typical working hours.

Schedule Four Item	Assessment of Environmental Effects
Where the activity includes the discharge of any contaminants, a description of: - Nature of the discharge - Sensitivity of the receiving environment - Alternative methods of discharge	No planned discharges. The site redevelopment will involve the removal of the identified contaminants of concern. Groundwater is not considered sensitive and therefore leaching to groundwater is likely to have a no more than minor impact.
Any effects on ecosystems, including plants or animals, physical disturbance of habitats in the vicinity	In accordance with the MfE (1999) Guidelines a Tier 1 ecological risk assessment has been conducted. No significant ecological receptors have been identified within close proximity of the site.
Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual or cultural, or other special values for present or future generation	No effects anticipated.
Description of the mitigation measures (safeguards and contingency plans) where relevant to be undertaken to help prevent or reduce actual or potential effect	A site management plan or remedial action plan is proposed to be issued and implemented during the redevelopment.
Where the scale or significance of the activity's effect are such that monitoring is required, a description of how, once the proposal is approved, effects will be monitored and by whom	Monitoring of site conditions and soil volumes is proposed.

11 References

ECan (2007a). *Background Concentrations of Selected Trace Elements in Canterbury Soils. Addendum 1: Additional Samples and Timaru Specific Background Levels.* Report prepared for Environment Canterbury by Tonkin & Taylor Limited, Christchurch, New Zealand. Report Number R07/1/2. Tonkin & Taylor Reference: 50875.003.

MfE (2002). *A Guide to the Management of Cleanfills*.

MfE (2011a). *Ministry for the Environment Hazardous Activities and Industries List.*

MfE (2011b). *Contaminated Land Management Guidelines No.1: Reporting on Contaminated Sites*.

MfE (2011c). *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values.*

MfE (2011d). *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*.

MfE (2011f). *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.*

MfE (2012). *Users' guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.*

WAMINZ. (2016). *Waste Management Institute New Zealand.* Technical Guidelines for Disposal to Land.

12 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Urban Estates Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by

Natalie Flatman

Environmental Scientist

Report reviewed by

Dave Robotham, CEnvP SC

Principal Environmental Consultant

FIGURES

DATE PLOTTED: 20 October 2020 9:43:28 am BY: NFlatman

Legend

Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

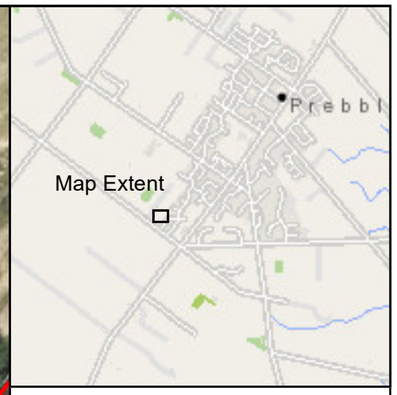
Title:
Site Location Plan

Client: Urban Estates		Figure No: 1
Project: 174 Hamptons Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: P2020.001.788	Scale: 1:2,500	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

PATH: Z:\Projects\17701 to 17800\17707 - 174 Hamptons Road, Prebbleton\06 CAD-GIS Figures\Fig01 Enviro.mxd

DATE PLOTTED: 20 October 2020 9:42:43 am BY: NFlatman



Legend

- Sample Locations
- Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title: Environmental Sampling Plan

Client: Urban Estates		Figure No: 2
Project: 174 Hamptons Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: P2020.001.788	Scale: 1:398	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

PATH: Z:\Projects\17701 to 17800\17707 - 174 Hamptons Road, Prebbleton\06_CAD-GIS_Figures\Fig01_Enviro.mxd

APPENDIX 1:

Site Photographs

Photo 1: Dwelling looking northeast

Photo 2: Tennis court in south-eastern corner of the site

Photo 3: Large glasshouse

Photo 4: Inside large glasshouse

Photo 5: Smaller glasshouse

Photo 6: Smaller glasshouse

ENGEO
Expect Excellence

Date taken	Aug 2020	**Client**	**Urban Estates**		
Taken by	NF	**Project**	**174 Hamptons Road**		
Approved by	DR	**Description**	**Site Photographs**		
Photo No.	1 to 6	**ENGEO Ref.**	17707	**Appendix Ref.**	1a

Photo 7: Stock loading pen

Photo 8: Burn pile in western paddock

Photo 9: Chemical storage shed to south of glasshouse

Photo 10: Southern paddock

Photo 11: Northern paddock

Photo 12: Northern paddock

ENGEO
Expect Excellence

Date taken	Aug 2020	**Client**	**Urban Estates**		
Taken by	NF	**Project**	**174 Hamptons Road**		
Approved by	DR	**Description**	**Site Photographs**		
Photo No.	7 to 12	**ENGEO Ref.**	17707	**Appendix Ref.**	1b

APPENDIX 2:

CRC LLUR 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

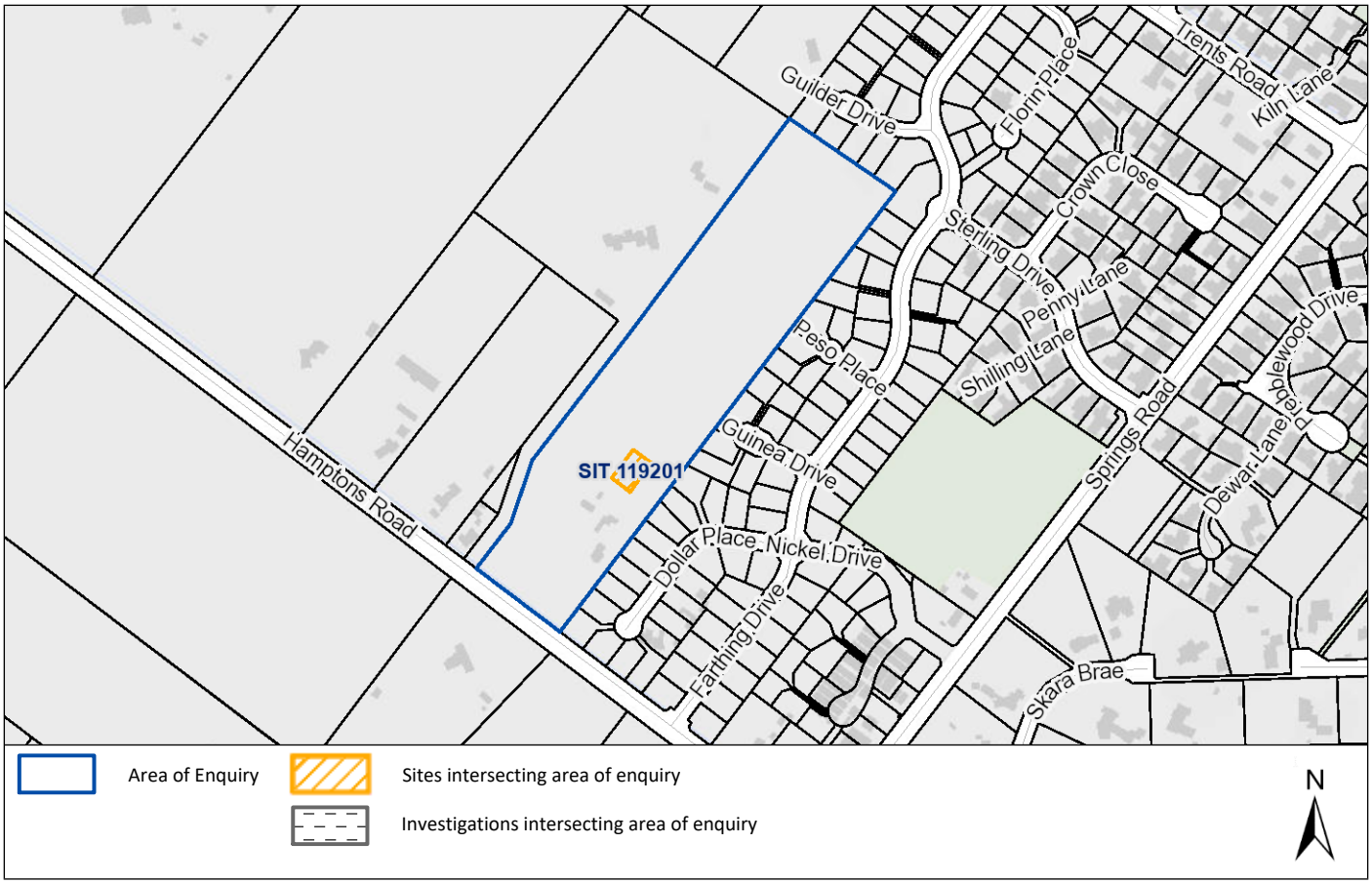
Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

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

www.ecan.govt.nz

Date:	21 August 2020
Land Parcels:	Lot 2 DP 366875 Valuation No(s): 2355201000



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
119201	174 Hamptons Rd	174 Hamptons Rd	A10 - Persistent pesticide bulk storage or use;	Not Investigated

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 119201: 174 Hamptons Rd (Intersects enquiry area.)

Site Address:	174 Hamptons Rd
Legal Description(s):	Lot 2 DP 366875

Site Category:	Not Investigated
Definition:	Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
1984	Present	Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds

Notes:

5 Nov 2014	This record was created as part of the Selwyn District Council 2015 HAIL identification project.
5 Nov 2014	Vegetable production, glasshouses
5 Nov 2014	BPs for glasshouses Mar 1979 - Dec 1981. First tomato crop grown 1979, rest of 9.7959ha property used for cropping - part of it in courgettes in 1979. 2004: glasshouses and small flower growing business. 2355201000 (and possibly 2355201001 which together*
5 Nov 2014	Area defined from 1994 to Present 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 ENQ261812.

Disclaimer: ***The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).***

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Listed Land Use Register

What you need to know

Everything is connected

What is the Listed Land Use Register (LLUR)?

The LLUR is a database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

Why do we need the LLUR?

Some activities and industries are hazardous and can potentially contaminate land or water. We need the LLUR to help us manage information about land which could pose a risk to your health and the environment because of its current or former land use.

Section 30 of the Resource Management Act (RMA, 1991) requires Environment Canterbury to investigate, identify and monitor contaminated land. To do this we follow national guidelines and use the LLUR to help us manage the information.

The information we collect also helps your local district or city council to fulfil its functions under the RMA. One of these is implementing the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil, which came into effect on 1 January 2012.

For information on the NES, contact your city or district council.

How does Environment Canterbury identify sites to be included on the LLUR?

We identify sites to be included on the LLUR based on a list of land uses produced by the Ministry for the Environment (MfE). This is called the Hazardous Activities and Industries List (HAIL)[1]. The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

We have two main ways of identifying HAIL sites:

- We are actively identifying sites in each district using historic records and aerial photographs. This project started in 2008 and is ongoing.
- We also receive information from other sources, such as environmental site investigation reports submitted to us as a requirement of the Regional Plan, and in resource consent applications.

[1] The Hazardous Activities and Industries List (HAIL) can be downloaded from MfE's website www.mfe.govt.nz, keyword search HAIL

How does Environment Canterbury classify sites on the LLUR?

Where we have identified a HAIL land use, we review all the available information, which may include investigation reports if we have them. We then assign the site a category on the LLUR. The category is intended to best describe what we know about the land use and potential contamination at the site and is signed off by a senior staff member.

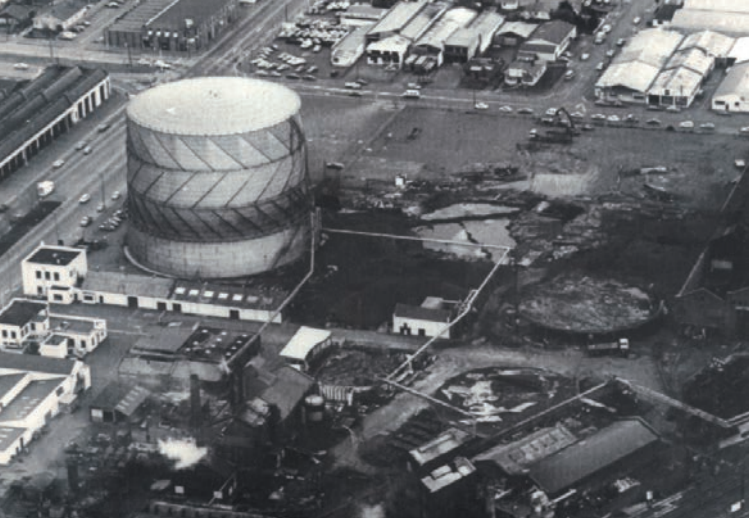
Please refer to the Site Categories and Definitions factsheet for further information.

What does Environment Canterbury do with the information on the LLUR?

The LLUR is available online at www.llur.ecan.govt.nz. We mainly receive enquiries from potential property buyers and environmental consultants or engineers working on sites. An inquirer would typically receive a summary of any information we hold, including the category assigned to the site and a list of any investigation reports.

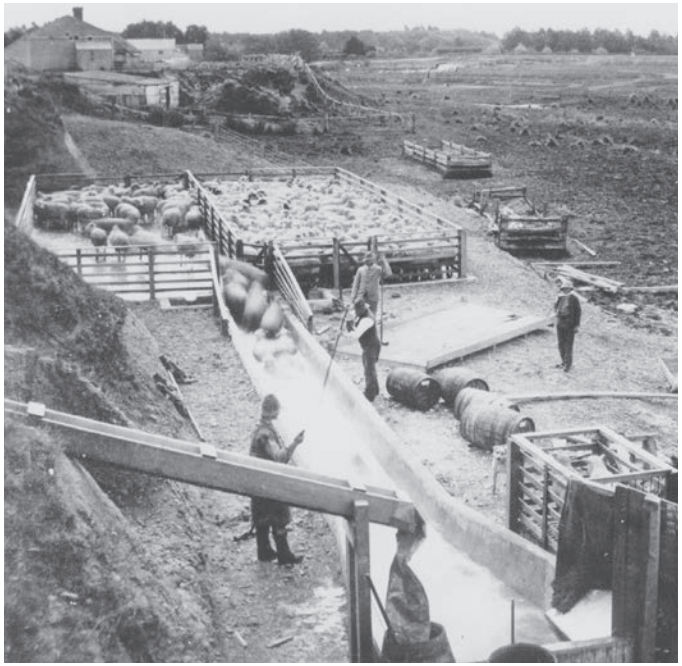
We may also use the information to prioritise sites for further investigation, remediation and management, to aid with planning, and to help assess resource consent applications. These are some of our other responsibilities under the RMA.

If you are conducting an environmental investigation or removing an underground storage tank at your property, you will need to comply with the rules in the Regional Plan and send us a copy of the report. This means we can keep our records accurate and up-to-date, and we can assign your property an appropriate category on the LLUR. To find out more, visit www.ecan.govt.nz/HAIL.



IMPORTANT!

The LLUR is an online database which we are continually updating. A property may not currently be registered on the LLUR, but this does not necessarily mean that it hasn't had a HAIL use in the past.



Sheep dipping (ABOVE) and gas works (TOP) are among the former land uses that have been identified as potentially hazardous. (Photo above by Wheeler & Son in 1987, courtesy of Canterbury Museum.)

My land is on the LLUR – what should I do now?

IMPORTANT! Just because your property has a land use that is deemed hazardous or is on the LLUR, it doesn't necessarily mean it's contaminated. The only way to know if land is contaminated is by carrying out a detailed site investigation, which involves collecting and testing soil samples.

You do not need to do anything if your land is on the LLUR and you have no plans to alter it in any way. It is important that you let a tenant or buyer know your land is on the Listed Land Use Register if you intend to rent or sell your property. If you are not sure what you need to tell the other party, you should seek legal advice.

You may choose to have your property further investigated for your own peace of mind, or because you want to do one of the activities covered by the National Environmental Standard for Assessing and Managing Contaminants in Soil. Your district or city council will provide further information.

If you wish to engage a suitably qualified experienced practitioner to undertake a detailed site investigation, there are criteria for choosing a practitioner on www.ecan.govt.nz/HAIL.

I think my site category is incorrect – how can I change it?

If you have an environmental investigation undertaken at your site, you must send us the report and we will review the LLUR category based on the information you provide. Similarly, if you have information that clearly shows your site has not been associated with HAIL activities (eg. a preliminary site investigation), or if other HAIL activities have occurred which we have not listed, we need to know about it so that our records are accurate.

If we have incorrectly identified that a HAIL activity has occurred at a site, it will be not be removed from the LLUR but categorised as Verified Non-HAIL. This helps us to ensure that the same site is not re-identified in the future.

Contact us

Property owners have the right to look at all the information Environment Canterbury holds about their properties.

It is free to check the information on the LLUR, online at www.llur.ecan.govt.nz.

If you don't have access to the internet, you can enquire about a specific site by phoning us on (03) 353 9007 or toll free on 0800 EC INFO (32 4636) during business hours.

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:
Calling from Christchurch: (03) 353 9007
Calling from any other area: 0800 EC INFO (32 4636)

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz E13/101

Listed Land Use Register

Site categories and definitions

When Environment Canterbury identifies a Hazardous Activities and Industries List (HAIL) land use, we review the available information and assign the site a category on the Listed Land Use Register. The category is intended to best describe what we know about the land use.

If a site is categorised as **Unverified** it means it has been reported or identified as one that appears on the HAIL, but the land use has not been confirmed with the property owner.

If the land use has been confirmed but analytical information from the collection of samples is not available, and the presence or absence of contamination has therefore not been determined, the site is registered as:

Not investigated:

- A site whose past or present use has been reported and verified as one that appears on the HAIL.
- The site has not been investigated, which might typically include sampling and analysis of site soil, water and/or ambient air, and assessment of the associated analytical data.
- There is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

If analytical information from the collection of samples is available, the site can be registered in one of six ways:

At or below background concentrations:

The site has been investigated or remediated. The investigation or post remediation validation results confirm there are no hazardous substances above local background concentrations other than those that occur naturally in the area. The investigation or validation sampling has been sufficiently detailed to characterise the site.

Below guideline values for:

The site has been investigated. Results show that there are hazardous substances present at the site but indicate that any adverse effects or risks to people and/or the environment are considered to be so low as to be acceptable. The site may have been remediated to reduce contamination to this level, and samples taken after remediation confirm this.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Managed for:

The site has been investigated. Results show that there are hazardous substances present at the site in concentrations that have the potential to cause adverse effects or risks to people and/or the environment. However, those risks are considered managed because:

- the nature of the use of the site prevents human and/or ecological exposure to the risks; and/or
- the land has been altered in some way and/or restrictions have been placed on the way it is used which prevent human and/or ecological exposure to the risks.

Partially investigated:

The site has been partially investigated. Results:

- demonstrate there are hazardous substances present at the site; however, there is insufficient information to quantify any adverse effects or risks to people or the environment; or
- do not adequately verify the presence or absence of contamination associated with all HAIL activities that are and/or have been undertaken on the site.

Significant adverse environmental effects:

The site has been investigated. Results show that sediment, groundwater or surface water contains hazardous substances that:

- have significant adverse effects on the environment; or
- are reasonably likely to have significant adverse effects on the environment.

Contaminated:

The site has been investigated. Results show that the land has a hazardous substance in or on it that:

- has significant adverse effects on human health and/or the environment; and/or
- is reasonably likely to have significant adverse effects on human health and/or the environment.

If a site has been included incorrectly on the Listed Land Use Register as having a HAIL, it will not be removed but will be registered as:

Verified non-HAIL:

Information shows that this site has never been associated with any of the specific activities or industries on the HAIL.

Please contact Environment Canterbury for further information:

(03) 353 9007 or toll free
on 0800 EC INFO (32 4636)
email ecinfo@ecan.govt.nz

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

E13/102

APPENDIX 3:

Certificates of Titles

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**277693**
Land Registration District	**Canterbury**
Date Issued	11 April 2006

Prior References
CB6C/550

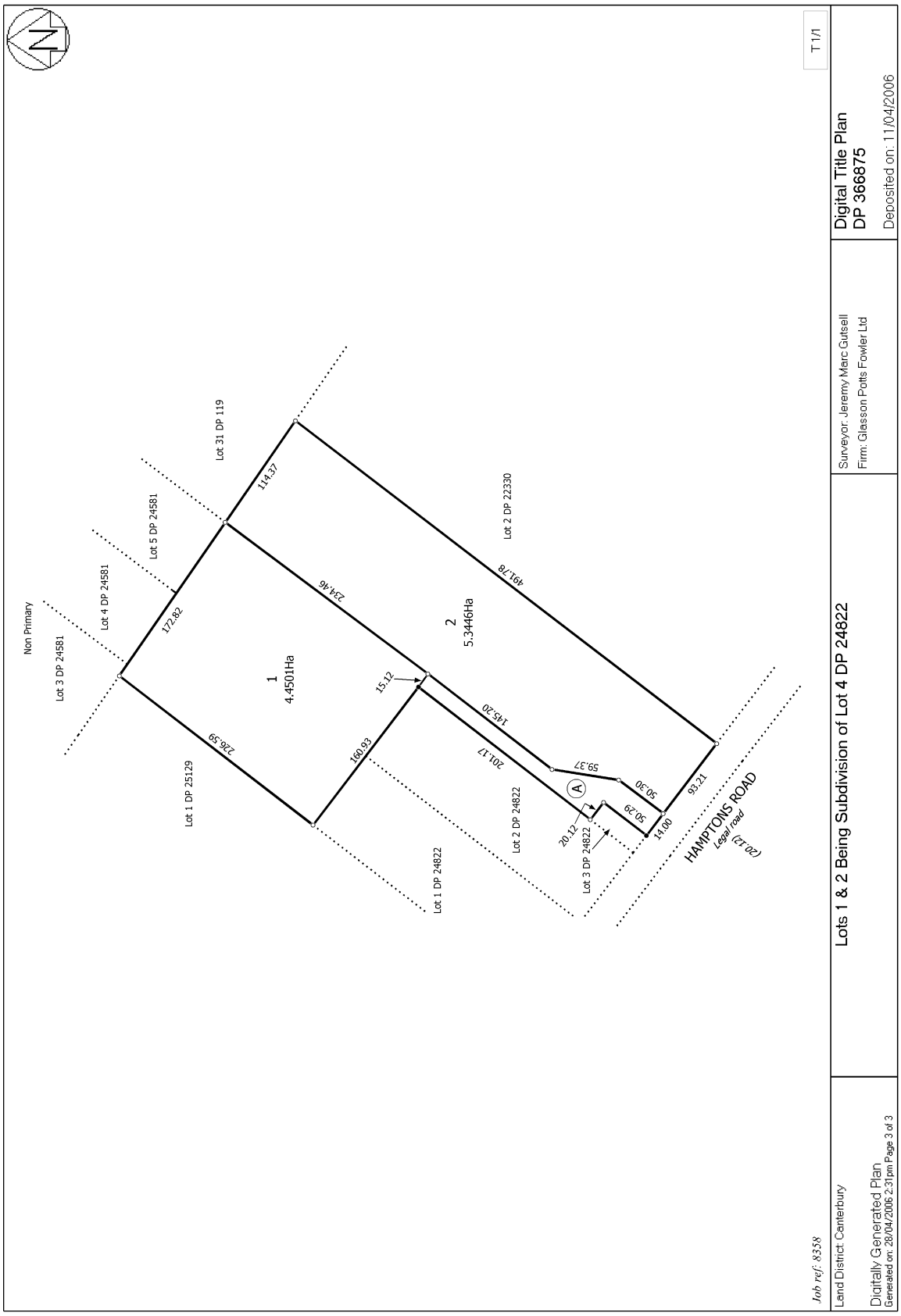
Estate	Fee Simple
Area	5.3446 hectares more or less
Legal Description	Lot 2 Deposited Plan 366875
Registered Owners	
Penelope Soper	

Interests

Appurtenant hereto is a right of way, a right to drain sewage and water and a right to convey water, electric power and telephonic communications created by Easement Instrument 6823837.3 - 11.4.2006 at 9:00 am

The easements created by Easement Instrument 6823837.3 are subject to Section 243 (a) Resource Management Act 1991

8195993.1 Surrender of the right of way, a right to drain sewage and water, right to convey water, electric power and telephonic communications specified in Easement Certificate 6823837.3 over part marked E on DP 404189 - 16.6.2009 at 9:00 am


N
T 1/1
Lot 31 DP 119
Lot 5 DP 24581
Lot 4 DP 24581
Non Primary
Lot 3 DP 24581
Lot 1 DP 25129
Lot 1 DP 24822
Lot 2 DP 24822
Lot 3 DP 24822
Lot 2 DP 22330
114.37
234.46
172.82
226.59
160.93
15.12
145.20
201.17
59.37
50.30
50.29
20.12
14.00
93.21
491.78
1
4.4501Ha
2
5.3446Ha
A
HAMPTONS ROAD
Legal road
(20.12)
Lots 1 & 2 Being Subdivision of Lot 4 DP 24822
Digital Title Plan
DP 366875
Deposited on: 11/04/2006
Surveyor: Jeremy Marc Gutsell
Firm: Glasson Potts Fowler Ltd
Land District: Canterbury
Digitally Generated Plan
Generated on: 28/04/2006 2:31pm Page 3 of 3
Job ref: 8358

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

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

Identifier **277693**

Land Registration District **Canterbury**

Date Issued 11 April 2006

Prior References
CB6C/550

Estate	Fee Simple
Area	5.3446 hectares more or less
Legal Description	Lot 2 Deposited Plan 366875

Original Registered Owners
Penelope Soper

Interests

Appurtenant hereto is a right of way, a right to drain sewage and water and a right to convey water, electric power and telephonic communications created by Easement Instrument 6823837.3 - 11.4.2006 at 9:00 am

The easements created by Easement Instrument 6823837.3 are subject to Section 243 (a) Resource Management Act 1991

8195993.1 Surrender of the right of way, a right to drain sewage and water, right to convey water, electric power and telephonic communications specified in Easement Certificate 6823837.3 over part marked E on DP 404189 - 16.6.2009 at 9:00 am

APPENDIX 4:

Laboratory Certificates

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:	Engeo Limited	**Lab No:**	2426843 SPv1
Contact:	Natalie Flatman C/- Engeo Limited PO Box 373 Christchurch 8140	**Date Received:**	28-Aug-2020
		Date Reported:	01-Sep-2020
		Quote No:	82742
		Order No:	
		Client Reference:	P2020.001.788
		Submitted By:	Natalie Flatman

Sample Type: Soil

		Sample Name:	S1 27-Aug-2020	S2 27-Aug-2020	S3 27-Aug-2020	S4 27-Aug-2020	S5 27-Aug-2020
		Lab Number:	2426843.1	2426843.2	2426843.3	2426843.4	2426843.5
Individual Tests							
Dry Matter	g/100g as rcvd		91	82	72	99	93
Heavy Metals with Mercury, Screen Level							
Total Recoverable Arsenic	mg/kg dry wt		10	6	23	4	11
Total Recoverable Cadmium	mg/kg dry wt		1.03	0.25	0.34	< 0.10	0.30
Total Recoverable Chromium	mg/kg dry wt		13	12	16	11	11
Total Recoverable Copper	mg/kg dry wt		25	13	41	9	41
Total Recoverable Lead	mg/kg dry wt		119	62	105	17.3	16.6
Total Recoverable Mercury	mg/kg dry wt		0.11	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt		11	8	8	9	6
Total Recoverable Zinc	mg/kg dry wt		1,410	280	240	53	171
Organochlorine Pesticides Screening in Soil							
Aldrin	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
alpha-BHC	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
beta-BHC	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
delta-BHC	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
gamma-BHC (Lindane)	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
cis-Chlordane	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
trans-Chlordane	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
2,4'-DDD	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
4,4'-DDD	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
2,4'-DDE	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
4,4'-DDE	mg/kg dry wt		0.012	< 0.012	0.014	< 0.010	0.016
2,4'-DDT	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
4,4'-DDT	mg/kg dry wt		0.014	< 0.012	0.016	< 0.010	< 0.011
Total DDT Isomers	mg/kg dry wt		< 0.07	< 0.08	< 0.09	< 0.06	< 0.07
Dieldrin	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Endosulfan I	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Endosulfan II	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Endosulfan sulphate	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Endrin	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Endrin aldehyde	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Endrin ketone	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Heptachlor	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Heptachlor epoxide	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Hexachlorobenzene	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011
Methoxychlor	mg/kg dry wt		< 0.011	< 0.012	< 0.014	< 0.010	< 0.011

Sample Type: Soil						
	Sample Name:	S6 27-Aug-2020	S7 27-Aug-2020	S8 27-Aug-2020	S9 27-Aug-2020	S10 27-Aug-2020
	Lab Number:	2426843.6	2426843.7	2426843.8	2426843.9	2426843.10
Individual Tests						
Dry Matter	g/100g as rcvd	78	82	76	-	-
Total Recoverable Lead	mg/kg dry wt	-	-	-	240	46
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	26	10	15	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.26	0.18	0.21	-	-
Total Recoverable Chromium	mg/kg dry wt	14	12	13	-	-
Total Recoverable Copper	mg/kg dry wt	31	26	29	-	-
Total Recoverable Lead	mg/kg dry wt	19.7	25	19.6	-	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	-	-
Total Recoverable Nickel	mg/kg dry wt	8	9	9	-	-
Total Recoverable Zinc	mg/kg dry wt	139	88	90	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
alpha-BHC	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
beta-BHC	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
delta-BHC	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
4,4'-DDD	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
4,4'-DDE	mg/kg dry wt	0.016	< 0.012	< 0.013	-	-
2,4'-DDT	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
4,4'-DDT	mg/kg dry wt	< 0.013	0.012	< 0.013	-	-
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.08	< 0.08	-	-
Dieldrin	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Endosulfan I	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Endosulfan II	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Endrin	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Endrin ketone	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Heptachlor	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-
Methoxychlor	mg/kg dry wt	< 0.013	< 0.012	< 0.013	-	-

	Sample Name:	S11 27-Aug-2020	S12 27-Aug-2020	S13 27-Aug-2020	S14 27-Aug-2020	
	Lab Number:	2426843.11	2426843.12	2426843.13	2426843.14	
Individual Tests						
Dry Matter	g/100g as rcvd	-	71	-	-	-
Total Recoverable Lead	mg/kg dry wt	157	-	2,200	750	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	1,730	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	-	0.85	-	-	-
Total Recoverable Chromium	mg/kg dry wt	-	520	-	-	-
Total Recoverable Copper	mg/kg dry wt	-	1,380	-	-	-
Total Recoverable Lead	mg/kg dry wt	-	1,780	-	-	-
Total Recoverable Nickel	mg/kg dry wt	-	34	-	-	-
Total Recoverable Zinc	mg/kg dry wt	-	2,000	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	< 0.4	-	-	-
1-Methylnaphthalene	mg/kg dry wt	-	< 0.014	-	-	-
2-Methylnaphthalene	mg/kg dry wt	-	< 0.014	-	-	-

Sample Type: Soil						
Sample Name:		S11 27-Aug-2020	S12 27-Aug-2020	S13 27-Aug-2020	S14 27-Aug-2020	
Lab Number:		2426843.11	2426843.12	2426843.13	2426843.14	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Acenaphthylene	mg/kg dry wt	-	< 0.014	-	-	-
Acenaphthene	mg/kg dry wt	-	< 0.014	-	-	-
Anthracene	mg/kg dry wt	-	< 0.014	-	-	-
Benzo[a]anthracene	mg/kg dry wt	-	< 0.014	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	< 0.014	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	< 0.04	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	< 0.04	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	< 0.014	-	-	-
Benzo[e]pyrene	mg/kg dry wt	-	< 0.014	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	-	< 0.014	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	-	< 0.014	-	-	-
Chrysene	mg/kg dry wt	-	< 0.014	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	-	< 0.014	-	-	-
Fluoranthene	mg/kg dry wt	-	0.014	-	-	-
Fluorene	mg/kg dry wt	-	< 0.014	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	< 0.014	-	-	-
Naphthalene	mg/kg dry wt	-	0.16	-	-	-
Perylene	mg/kg dry wt	-	< 0.014	-	-	-
Phenanthrene	mg/kg dry wt	-	0.048	-	-	-
Pyrene	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%.	-	1-14
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%.	-	9-11, 13-14
Total of Reported PAHs in Soil	Sonication extraction, GC-MS or GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	12
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	12
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-8
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD or GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8081 or 8270.	0.010 - 0.06 mg/kg dry wt	1-8
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS or GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	12
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	1-8, 12
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	9-11, 13-14
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	9-11, 13-14

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	12
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	12

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

Testing was completed between 31-Aug-2020 and 01-Sep-2020. 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

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:	Engeo Limited	**Lab No:**	2453708	SPv1
Contact:	Natalie Flatman	**Date Received:**	12-Oct-2020	
	C/- Engeo Limited	**Date Reported:**	15-Oct-2020	
	PO Box 373	**Quote No:**	107705	
	Christchurch 8140	**Order No:**		
		Client Reference:	17707	
		Submitted By:	Natalie Flatman	

Sample Type: Soil

	Sample Name:	S16 12-Oct-2020	S17 12-Oct-2020	S18 12-Oct-2020	S19 12-Oct-2020	S20 12-Oct-2020
	Lab Number:	2453708.1	2453708.2	2453708.3	2453708.4	2453708.5
Total Recoverable Lead	mg/kg dry wt	340	260	370	176	1,430

	Sample Name:	S21 12-Oct-2020	S22 12-Oct-2020	S23 12-Oct-2020	S24 12-Oct-2020	S25 12-Oct-2020
	Lab Number:	2453708.6	2453708.7	2453708.8	2453708.9	2453708.10
Total Recoverable Lead	mg/kg dry wt	200	1,940	112	61	77

	Sample Name:	S26 12-Oct-2020	S27 12-Oct-2020			
	Lab Number:	2453708.11	2453708.12			
Total Recoverable Lead	mg/kg dry wt	152	164	-	-	-

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 Rapid Sample Preparation*	Dried at 103°C (removes 3-5% more water than air dry) for a minimum of 2hr, gravimetry. Replaces Environmental Solids Sample Prep under certain circumstances.	-	1-12
Environmental Solids Sample Drying*	Dried at 103°C (removes 3-5% more water than air dry) for a minimum of 2hr, gravimetry. Replaces Environmental Solids Sample Prep under certain circumstances.	-	1-12
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-12
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	1-12

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

Testing was completed on 15-Oct-2020. 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.

Kim Harrison MSc
Client Services Manager - Environmental

TERRA SCIENTIFIC

Terra Scientific Ltd

43a Moorhouse Avenue,

Addington,

Christchurch, 8011

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W: www.terrasci.co.nz

ACCREDITED
IANZ
TESTING LABORATORY
Nº 1334

Version Number: 10	Date Issued: August 2020	Authorised By: JC	Controlled Document

Client Name:	ENGEO Christchurch	**Job Number:**	T002741	**Total Samples Received:**	3
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	Hamptons	**Date Received:**	31/08/2020
Client Reference:	P2020.001.788			**Date Analysed:**	1/09/2020
Client Contact:	Natalie Flatman	**Analyst:**	Sarah Giles	**Date Reported:**	2/09/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T002741.1	1	S9, Soil											
		Layer 1: >10 mm	672.15	16.80	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		11.26	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		491.15	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		50.55									
		Total sample weight:		519.21	Total Combined:	0.00000	0.00000	0.00000					
T002741.2	2	S10, Soil											
		Layer 1: >10 mm	1036.75	38.35	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		17.72	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		799.62	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		50.26									
		Total sample weight:		855.69	Total Combined:	0.00000	0.00000	0.00000					

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IANZ
TESTING LABORATORY
Nº 1334

Client Name:	ENGEO Christchurch	**Job Number:**	T002741	**Total Samples Received:**	3
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	Hamptons	**Date Received:**	31/08/2020
Client Reference:	P2020.001.788			**Date Analysed:**	1/09/2020
Client Contact:	Natalie Flatman	**Analyst:**	Sarah Giles	**Date Reported:**	2/09/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T002741.3	3	S11, Soil											
		Layer 1: >10 mm	1674.61	264.64	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		49.57	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		599.68	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		50.33									
		Total sample weight:		913.89	Total Combined:	0.00000	0.00000	0.00000					

Method References and Disclaimers

Samples were analysed in accordance with:
AS4964-2004 Australian Standard - Method for Qualitative Identification of Asbestos in Bulk Samples
BRANZ - New Zealand Guidelines for Assessing and Managing Asbestos in Soil 2017

Disclaimers:
Samples are reported 'As Received'. Terra Scientific takes no responsibility for sampling processes, client sample descriptions and sample locations as these were provided by the client.
The results presented in this report relate specifically to the samples submitted for this job.
The detection limit is 0.1g/1kg (0.01% w/w) as stated in the AS4964-2004. Samples that contain asbestos less than this limit are outside the scope of accreditation.
Asbestos calculations are outside the scope of accreditation.
All opinions and interpretations are outside the scope of accreditation.
This report shall not be reproduced, except in full, without the written consent of the Key Technical Person assigned to this report.

For any queries regarding this report, please do not hesitate to contact the laboratory and speak with the Key Technical Person.

Jessica Campbell
Managing Director
Key Technical Person

ENGEO

Celebrating 10 YEARS IN NZ

Combined Preliminary and Detailed Site Investigation

182 and 200 Hamptons Road

Prebbleton

Canterbury

Submitted to:

Urban Estates Limited

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ENGEO Document Control:

Report Title	Combined Preliminary and Detailed Site Investigation - 182 and 200 Hamptons Road, Prebbleton			
Project No.	17903.000.001	Doc ID	04	
Client	Urban Estates Limited	Client Contact	Justin McDonald	
Distribution (PDF)	Urban Estates Limited			
Date	Revision Details/Status	WP	Author	Reviewer
23/10/2020	Issued to Client	DF	HA/NF	DR

1 Introduction

ENGEO Ltd was requested by Urban Estates Limited to undertake a combined Preliminary and Detailed Site Investigation (PSI / DSI) of the property at 182 and 200 Hamptons Road in Prebbleton, Canterbury (herein referred to as 'the site'). This work has been carried out in accordance with our signed agreement dated 12 October 2020 (P2020.002.788_01). The investigation area is shown in Figure 1. ENGEO understands that the site is to undergo a plan change for residential land use, with eventual residential subdivision which will likely involve soil disturbance and require information on the suitability of the site and soil quality.

This PSI/DSI was completed in order to satisfy Selwyn District Council (SDC) requirements in relation to the plan change assessment and for potential future subdivision requirements in accordance with the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES).

This PSI / DSI was undertaken in general accordance with the MfE 2011 Contaminated Land Management Guidelines (CLMG) No.5: Guidelines for Site Investigation and Site Analysis of Soil and reported in general accordance with the MfE 2011 CLMG No.1: Reporting on Contaminated Sites in New Zealand.

1.1 Objective of the Assessment

The objectives of this assessment were to:

- Evaluate and identify conditions of releases and threatened releases of hazardous substances on, at, in or to the subject property;
- Evaluate the presence and extent of identified contaminants of concern (COC) at the site; and
- Assess whether the COCs pose an unacceptable risk to human health or the environment for the proposed plan change and future potential subdivision.

1.2 Approach

To satisfy the objectives, ENGEO sought to gather information regarding the following:

- Current and past property uses and occupancies;
- Current and past uses of hazardous substances;
- Waste management and disposal activities that could have caused a release or threatened release of hazardous substances;
- Current and past corrective actions and response activities to address past and ongoing releases of hazardous substances at the subject property;
- Properties adjoining or located near the subject property that have environmental conditions that could have resulted in conditions indicative of releases or threatened releases of hazardous substances to the subject property; and
- COC concentrations within the soils underlying the site.

2 Site Description and Setting

The total site area is 15.41 ha, with the legal identifier Lot 1 DP 404189 and Lot 1 DP 25129. It is located at 182 and 200 Hamptons Road in Prebbleton. The site is currently being used for mixed residential and agricultural use. ENGEO understands that the site is to be re-zoned for future potential residential subdivision.

Site information is summarised in Table 1 with photographs of the site taken during the site walkover provided in Appendix 1.

Table 1: Site Information

Item	Description
Location	182 and 200 Hamptons Road, Prebbleton
Legal Description	Lot 1 DP 404189 and Lot 1 DP 25129
Current Land Use	Residential areas present on all sites with agricultural grazing undertaken in the paddocks areas.
Proposed Land Use	Residential
Building Construction and Use	182 Main Dwelling – Concrete foundation, brick cladding, metal joinery and roof. 182 Second Dwelling – Concrete foundation, modern compressed board cladding, metal joinery and roof. 182 Carport/Sleep Out - Concrete foundation, metal cladding, joinery and roof. 182 – Carport/Storage – Concrete foundation, timber pole, metal cladding and roof. 200 Main Dwelling – Concrete foundation, brick cladding metal joinery and roof. 200 Carport/Storage – Concrete foundation, timber pole, metal joinery and cladding.
Site Area	15.41 ha
Territorial Authority	Selwyn District Council
Zoning	IP – Inner Plains

The site setting is summarised in Table 2.

Table 2: Site Setting

Item	Description
Topography	The sites are predominantly flat with minor undulations. They have an elevation of approximately 24 meters above sea level.
Local Setting	The surrounding area is a mix of agricultural and lifestyle blocks with low density residential housing.
Nearest Surface Water & Use	There are two un-named land drains located along Hamptons Road and Trents Road. It is presumed that they are used for stormwater.

2.1 Geology and Hydrogeology

The documented geology and hydrogeology of the site and surrounding area is summarised in Table 3 below.

Table 3: Geological and Hydrogeological Information

Item	Description
Geology	According to GNS Science, the geology is described as Late Quaternary alluvium and colluvium; Unconsolidated to poorly consolidated mud, sand, gravel and peat of alluvial and colluvial origin.
Hydrogeology	The site is located over an unconfined / semiconfined gravel aquifer with groundwater estimated to flow in a south easterly direction.
Groundwater Abstractions	There are three active wells on-site: M36/2882: GF Rhodes for domestic supply. M36/4871: AG and JM Marshall for domestic and stockwater supply. M36/8265: MD and A Larson for domestic and stockwater supply. There are seven more wells within 250 m of the site for domestic, stockwater and irrigation supply.
Discharge Consents	There is one current discharge consent on-site: CRC072413: Canterbury Trustees (2004) Limited & Mr M D & Mrs C A Larson to discharge domestic wastewater to land. Two other discharge consents are within 250 m of the site for discharge of wastewater to land.

3 Site History

A number of sources were used to investigate the past uses of the site. The findings of these information searches have been summarised in this section.

3.1 Listed Land Use Register

Canterbury Regional Council (CRC) maintains a Listed Land Use Register (LLUR) of past and current land uses within the Canterbury Region. The LLUR documents properties on which potentially hazardous activities have been undertaken. The potentially hazardous activities are defined on the MfE HAIL. Identifying a HAIL activity on the site triggers the requirement for a contaminated land assessment prior to development under the NES.

The CRC LLUR property statement was requested by ENGEO on 8 October 2020 for the site and is presented in Appendix 2. The following table summarises the information held on the LLUR for the site.

Table 4: Summary of the CRC LLUR Register

Period From	Period To	HAIL Activity(s)	LLUR Category
None	None	No activities identified	None provided
Additional Information from LLUR Statement	No additional information provided.		

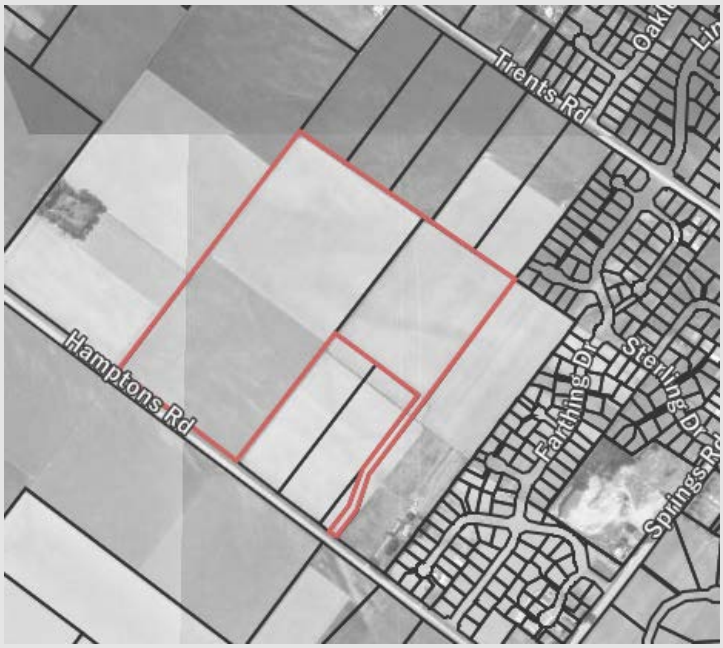
3.2 Historical Aerial Photographs

Aerial photographs obtained from Canterbury Maps from 1940 to 2019 have been reviewed. The relevant visible features are summarised in Table 5.

Table 5: Historical Aerial Photograph Review

Date	Description	Image
1940-1944	Both sites are undeveloped and appear to be grassed. The surrounding area is mainly undeveloped with structures present at 232 and 174 Hamptons Road.	

Date	Description	Image
1955-1959	Only part of this aerial photograph was available. The area visible on the photograph shows that 182 Hamptons Road appears to be covered in vegetation and 200 Hamptons Road is still grassed. The surrounding area appears mainly unchanged from the previous photograph.	
1960-1964	The vegetation at 182 Hamptons Road has been cleared and the site is still undeveloped. 200 Hamptons Road is still grassed and is undeveloped. The surrounding area is still mainly undeveloped and is presumably used for grazing.	

Date	Description	Image
1965-1969	The aerial photograph remains mainly unchanged from the previous photograph.	
1970-1974	The sites are mainly unchanged from the previous aerial photograph. Residential dwellings have been constructed at 190 and 192 Hamptons Road.	

Date	Description	Image
1980-184	The site at 182 Hamptons Road appears to have been cropped with visible lines across the paddocked area. The site at 200 Hamptons Road is still undeveloped and three smaller paddocked areas are visible. A dwelling and other structures are visible at 232 Hamptons Road.	
1985-1989	Only part of this aerial photograph was available. The two sites and surrounding area are mainly unchanged from the previous photograph. Residential development has occurred on the sites to the north.	

Date	Description	Image
1990-1994	The two sites are mainly unchanged from the previous aerial photograph. The nursey is visible at 382 Trents Road with visible planting between the boundary line and approximately 25 m from the nursery planting.	
1995-1999	The aerial photograph remains mainly unchanged from the previous photograph	

Date	Description	Image
2000-2004	A residential dwelling has been constructed in the south-eastern corner of 200 Hamptons Road. The site at 182 Hamptons is unchanged from the previous photograph. Trees have been planted to the north of 190 and 192 Hamptons Road. The remainder of the surrounding area remains mainly unchanged.	
2010-2015	Two dwellings and a shed building have at 182 Hamptons Road along the eastern boundary. The remainder of the two sites are still grassed and appear to be used for grazing. The surrounding area appears mainly unchanged.	

3.3 Selwyn District Council Property File

The property files for the sites that are held by Selwyn District Council were reviewed as part of this investigation. One email within the file for 182 Hamptons Road Titled Potential Contamination – 23552 010 01 – 182 Hamptons Road dated 31 January 2018 read:

This property was identified on a preliminary list (prepared by SDC in September 2014), of potentially contaminated sites due to its possible previous use involving horticulture. This SDC list along with other Information relating to the site has been separately assessed by ECan and the site has not been included on the Listed Land Use Register. Never the less this preliminary list is information that SDC holds in relation to the property so disclosure is appropriate enabling further consideration as to whether or not additional research is required relating to the existence or otherwise of previous uses.

3.4 Certificate of Title

A review of the certificate of title was completed with no information related to potential contaminating activities identified. The Certificates of Title are attached in Appendix 3.

4 Current Site Conditions

A site walkover was completed by an ENGEO representative on 14 October 2020. A summary of the walkover is provided in Table 6 below.

Table 6: Site Conditions from Walkover

Site Condition	Comments
Visible signs of contamination	A burn pile was observed to the south of the dwelling in the southern paddock at 182 Hamptons Road. The burn pile was approximately 6 x 6 m in size. A burn pile was observed to the north of the dwelling near the chicken coups at 200 Hamptons Road. The burn pile was approximately 3 x 3 m in size.
Surface water appearance	No surface water observed during the time of the walkover. The water race appeared to be clear and flowing with no sheens or suspended sediment observed.
Current surrounding land use	The surrounding land use is agricultural with associated residential housing.
Local sensitive environments	An un-named water race is present along Hamptons Road and Trents Road.
Visible signs of plant stress	There were no visible signs of plant stress observed during the time of the walkover.
Ground cover	The sites were predominantly grassed with gravel access roads.
Additional Observations (if any)	Stockpiled clean soil was observed in the north-eastern corner of the site at 182 Hamptons Road. Anecdotal evidence from the site owner stated that the stockpiled material was the foundation excavation (topsoil) from the second dwelling on-site. A small area of bare ground was observed to the west of the chicken coup at 182 Hamptons Road. Anecdotal evidence from the site owner states that the area is a recent offal pit (poultry only) and no waste or other materials are present in the pit.

5 Summary of the Preliminary Site Investigation

Potential sources of contamination at the site were assessed. The information is summarised in Table 7 and included possible waste disposal to land from the burn piles identified on the site. The remainder of the site is considered highly unlikely to have had an activity included on the HAIL undertaken on it and is therefore considered suitable for the proposed sub-division.

The property file for 182 Hamptons Road noted potential horticultural activities. The email saved within the property file (refer to Section 3.3) relates to an ECan investigation which concluded that the site at 182 Hamptons Road should not be listed on the LLUR. It is likely that it was originally listed on the LLUR as the neighbouring site at 174 Hamptons Road was listed on the LLUR for A10 persistent pesticide use which is defined to an area around glasshouses. The LLUR for 174 Hamptons Road states that cropping has occurred on the remainder of the site which presumably included the site at 182 Hamptons Road prior to subdivision. However, Penny Soper, site owner at 174 Hamptons Road stated on 27 August 2020 that the northern paddocks at 174 and 182 Hamptons Road was only ever cropped for stock feed, not horticultural activities.

Table 7: Potential Contaminants at the Site

Potential Source of Contamination	Contaminants of Concern	Possible Extent of Contamination	HAIL Activity as defined by the NES (soil)
Burn pile Area 1 and Area 2	Heavy metals PAHs	Burn pile and surrounding soils	G5: Waste disposal to land

6 Intrusive Investigation

Based on the review of the historical site uses, the COCs identified as part of this investigation were heavy metals and PAHs from the two burn piles observed during the site walkover.

A total of ten samples were taken around the burn piles. Soil samples were collected from each location to assess the potential risks to human health posed by the historical and current contamination sources, disposal options for soils removed during the redevelopment and for the suitability of the site for the proposed residential plan change and potential future residential subdivision. The soil sample depths and analysis at each location were determined by the site's history and on-site observations.

6.1 Field Work Methodology

The following fieldwork methodology was undertaken:

- Completion of ten samples from targeted locations, with soil samples taken from 0.0 to 0.3 m bgl. The rationale of the samples is included in Section 8.2;
- Soil samples were taken from specific areas of concern as the potential impacts would likely have been limited to those areas. The locations would also represent areas where redevelopment workers would potentially come into contact with the material and would be representative of material to be disposed of off-site;
- All soil samples were placed in jars supplied by RJ Hill Laboratories (Hills), which were then capped, labelled with a unique identifier and placed in chilled containers (chilly bins) prior to transportation to the laboratory. Samples were transported to Hills under standard ENGEO chain of custody documentation in Appendix 4;
- To reduce the potential for cross-contamination, each sample was collected using disposable nitrile gloves that were discarded following the collection of each sample;

- After the collection of each sample, the sampling equipment was decontaminated by washing with a solution of Decon90 and rinsing with tap water followed by deionised water;
- The intrusive samples were completed in accordance with ENGEO standard operating procedures with logging completed in general accordance with the New Zealand Geotechnical Society Inc. 'Guidelines for the Field Classification of Soil and Rock for Engineering Purposes' December 2005;
- All fieldwork and sampling was completed in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*'
- Samples were collected from the hand auger of hand trowel at each location and inspected for visual and olfactory indicators of contamination; and
- Following receipt of the samples by Hills, the soil samples were scheduled for analysis of the identified contaminants of concern – heavy metals and PAHs.

6.2 Quality Assurance and Quality Control

The quality assurance / quality control (QA/QC) procedures employed during the works included:

- Standard sample registers and chain of custody records have been kept for all samples;
- The use of the Hills who have certification through the International Accreditation New Zealand (IANZ). To maintain their accreditation, Hills undertake rigorous cross checking and routine duplicate sample testing to ensure the accuracy of their results; and
- During the site investigation, every attempt was made to ensure that cross contamination did not occur through the use of procedures outlined within this document.

7 Regulatory Framework and Assessment Criteria

7.1 Selwyn District Council

In making any plan change application to rezone land for a new residential or business area, certain information is required to accompany the request. The requirements are set in Clause 22 of the First Schedule to the Act.

Clause 22 states:

- *A request made under Clause 21 shall be made to the appropriate local authority in writing and shall explain the purpose of, and reasons for, the proposed plan or change to a policy statement or plan and contain an evaluation report prepared in accordance with section 32 for the proposed plan or change.*
- *Where environmental effects are anticipated, the request shall describe those effects, taking into account clauses 6 and 7 of Schedule 4, in such detail as corresponds with the scale and significance of the actual and potential environmental effects anticipated from the implementation of the change, policy statement, or plan.*

This report will provide an assessment of the site in regards to its suitability of the site for the proposed plan change for applicable information only.

7.2 NES

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on 1 January 2012 (MfE, 2011).

The NES introduced soil contaminant standards (SCSs) for 12 priority contaminants for the protection of human health under a variety of land use scenarios.

The NES requires the *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values* be used where a NES SCS is not available. The NES does not consider environmental receptors; accordingly, the application of guidelines relevant to environmental receptors shall be implemented according to the MfE CLMG No.2 and relevant rules in the regional plan.

7.3 Disposal Criteria

An assessment of potential off-site disposal options for excess soil generated during site development works has been conducted. Dependent on the contamination conditions of the spoil, off-site disposal options range from disposal to "cleanfill" sites to managed waste sites. As outlined in the publication Waste Management Institute of New Zealand Technical Guidelines for Disposal to Land (August 2018) the definition of cleanfill states:

"Virgin excavated natural materials (VENM) such as clay, soil and rock that are free of:

- Combustible, putrescible, degradable or leachable components;
- Hazardous substances or material (such as municipal solid waste) likely to create leachate by means of biological breakdown;
- Products or materials derived from hazardous waste treatment, stabilisation or disposal practices;
- Materials such as medical and veterinary waste, asbestos or radioactive substances that may present a risk to human health if excavated;
- Contaminated soil and other contaminated materials; and
- Liquid waste."

7.4 Assessment Criteria

Contaminant concentrations in soil were compared to human health criteria based on two land uses:

- Residential land use criteria (used for future land use); and
- Commercial / Industrial land use (based on an outdoor worker scenario) (for redevelopment workers).

The land use scenarios are relevant to the likely future use of the site and are being used as a surrogate to assess short term risks to redevelopment earthworkers on-site during the development activities.

The NES methodology document notes that the exposure parameters assumed for the maintenance / excavation scenario in other New Zealand guidelines are unrealistic (perhaps by a factor of ten or more). The technical committee preparing the NES decided that a maintenance / excavation worker scenario should not be included in the NES as sites would not be cleaned up to this standard; it was considered more appropriate that exposures to these workers be limited through the use of site-specific controls that are required under health and safety legislation. However, this report uses commercial / industrial outdoor worker criteria to get a general sense of potential risks to excavation workers during the redevelopment. Note that commercial / industrial outdoor worker criteria are based on personnel carrying out maintenance activities involving soil exposure to surface soil during landscaping activities, and occasional shallow excavation for routine underground service maintenance. Exposure to soil is less intensive than would occur during construction works but occurs over a longer period.

For a construction worker developing the site, the soil exposure is limited when compared to a large earthworks project (e.g. for a residential subdivision or industrial development). As such, the commercial / industrial outdoor worker criteria are considered suitable for obtaining a high-level understanding of potential risks to excavation workers during site redevelopment and confirming the need for site controls.

8 Results

8.1 Field Observations

A summary of the field observations is presented in Table 8 below.

Table 8: Typical Subsurface Geology

Geological Unit	Typical Depth (m bgl)	Material Description
TOPSOIL	0.0-0.35	Silty fine to medium SAND with trace gravel and rootlets; brown.
ALLUVIUM	0.35-1.3	Silty fine to medium SAND; light brown.
ALLUVIUM	1.3-2.2	Sandy fine to coarse GRAVEL with trace cobbles; brown.

Groundwater was not encountered in any of the sample locations. Visual evidence of burnt material was observed in the sample collected from the burn pile areas. The burn pile material was approximately 0.3 m in height and approximately 6 x 6 m wide.

8.2 Sample Rationale

The sample rationale is listed in Table 9 below.

Table 9: Sample Rationale

Location on-site	Sample Number	HAIL Activity	Analysis
Area 1	182_A1S1, 182_A1S2, 182_A1S3, 182_A1S4, 182_A1S5	G5	Heavy metals PAHs
Area 2	200_A1S1, 200_A1S2, 200_A1S3, 200_A1S4, 200_A1S5	G5	Heavy Metals PAHs

Discussion of the Results

Soil analytical results and the adopted soil assessment criteria are presented in Table 10. Certified laboratory analysis reports are included in Appendix 4.

The analytical results can be summarised as follows:

182 Hamptons Road – Area 1

Arsenic was reported above the NES residential land use SCS. Samples also reported arsenic, cadmium, chromium, copper, lead and zinc above the site specific regional background levels for the site. The benzo-a-pyrene equivalent value was below the limit of laboratory detection.

200 Hamptons Road – Area 1

Arsenic and lead was reported above the NES residential land use SCS. Samples also reported arsenic, cadmium, chromium, copper, lead and zinc above the site specific regional background levels for the site. The benzo-a-pyrene equivalent value was below the limit of laboratory detection.

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Table 10: Analysis Results

Analyte	Units	182_A1S1	182_A1S2	182_A1S3	182_A1S4	182_A1S5	200_A1S1	200_A1S2	200_A1S3	200_A1S4	200_A1S5	Additional Criteria	Assessment Criteria	
Lab Sample ID		2455982_1	2455982_2	2455982_3	2455982_4	2455982_5	2455985_1	2455985_2	2455985_3	2455985_4	2455985_5	Background (bl) - Canterbury Regional	Residential - 10% produce	Industrial
Soil Depth		surface	surface	surface	surface	surface	surface	surface	surface	surface	surface			
Sample Date		14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020			
Heavy Metals														
Arsenic	mg/kg	**540**	**23**	4	5	10	**34**	**31**	**31**	**41**	**14**	**12.58**	20 (A)	70 (A)
Cadmium	mg/kg	**2.2**	< 0.10	< 0.10	< 0.10	< 0.10	**0.51**	**0.51**	**0.33**	**1.71**	**0.31**	**0.19**	3 (A)	1300 (A)
Chromium	mg/kg	**260**	21	14	15	16	**101**	**32**	**29**	**55**	19	**22.7**	460 (A)	6300 (A)
Copper	mg/kg	**460**	**24**	5	5	9	**65**	**48**	**40**	**69**	19	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	**62**	17.7	15.5	15.5	15.2	**99**	**50**	39	**340**	**44**	**40.96**	210 (A)	3300 (A)
Nickel	mg/kg	16	9	9	9	9	11	9	10	13	8	**20.7**	400 (B)	6000 (B)
Zinc	mg/kg	**600**	75	54	55	54	**280**	**188**	**150**	**1480**	**101**	**96.94**	7400 (B)	400000 (B)
Polycyclic Aromatic Hydrocarbons														
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	mg/kg	< 0.03	-	-	-	-	< 0.03	-	-	-	-	**-**	10 (A)	35 (A)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
This table does not represent the full analytical results, please refer to the laboratory results for full details.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013)

9 Conceptual Site Model

A conceptual site model consists of four primary components. For contaminants to present a risk to human health or an environmental receptor, all four components are required to be present and connected. The four components of a conceptual site model are:

- Source of contamination;
- Pathway(s) in which contamination could potentially mobilise along (e.g. vapour or groundwater migration);
- Sensitive receptor(s) which may be exposed to the contaminants; and
- An exposure route, where the sensitive receptors and contaminants come into contact (e.g. ingestion, inhalation, dermal contact).

The potential source, pathway and receptor linkages at this subject site are provided in Table 11.

Table 11: Conceptual Site Model

Potential Sources	Potential Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk?
Burn Pile	Heavy metals PAHs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**No**, arsenic and lead present above guideline criteria in soil samples taken.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	

10 Conclusions

ENGEO understands that the site is to undergo a plan change assessment, with the potential for future residential subdivision. An assessment of the site for its suitability for the proposed plan change is required under the Selwyn District Council requirements. During the potential residential subdivision, soil disturbance and removal is likely to occur.

As part of the sub-division process ENGEO has undertaken a PSI and sampling of soils in areas of potential concern.

The PSI information collected indicates that the site has been used for mixed purposes which includes agricultural, residential land use and small scale burn piles, with the latter operation having the potential to impact the underlying soils.

The majority of the site is considered highly unlikely to have an activity included on the HAIL list undertaken on it and therefore it is considered suitable for plan change, subdivision and its proposed residential end use.

Soil testing was undertaken in the areas of the burn pits to assess the concentrations of contaminants of concern at the site, and to provide advice regarding the suitability of the site for the proposed plan change, potential residential subdivision, the health and safety of future redevelopment workers, disposal options, and whether resource consents would be required for the future redevelopment works.

The soil sampling comprised the collection of a total of ten soil samples from the four areas of concern at the site (see Figure 2 and 3 for reference).

The soil samples were submitted to either RJ Hill Laboratories to be analysed for the presence of the identified contaminants of concern. The results from the laboratory analysis indicate the following:

182 Hamptons Road Area 1: Burn Pile

A burn pile with obvious signs of contamination other than greenwaste was observed. Soil samples returned arsenic above the Residential land use criteria. Arsenic, cadmium, chromium, lead and zinc were also observed above the expected regional background levels.

200 Hamptons Road Area 1: Burn Pile

A burn pile with obvious signs of contamination other than greenwaste was observed. Soil samples returned arsenic and lead above the Residential land use criteria. Arsenic, cadmium, chromium, lead and zinc were also observed above the expected regional background levels.

Disposal Options

As the soil analysis results were above the regional background levels for the site, any material excavated from the burn pile areas is unlikely to be able to be disposed of at a cleanfill facility unless soil mixing and dilution occurred.

Suitability of the Site for Plan Change and Future Residential Subdivision

Based on the results taken from the two burn piles, if future residential land users come into contact with the soil, a complete contaminant exposure pathway is likely to be present and an unacceptable risk to human health would exist. Therefore, in the areas around the burn piles future residential subdivision is likely to be considered a restricted discretionary activity under Regulation 10 of the NES for Assessing and Managing Contaminants in Soil to Protect Human Health.

There are several options available to mitigate the risks to human health and enable the burn pile areas to be subdivided and used for residential land use. The options available are:

- Excavation and removal from the site of contamination above the human health SCS for the proposed residential land use. This would likely require consent for the disturbance of the ‘contaminated site’ during remediation. Disposal to off-site landfills should be investigated to confirm the costs associated with this option.

- The placement of a barrier over the existing impacted areas to adequately impact exposure. This could include stabilising, capping and containing the soils exceeding the relevant SCS. If this option is chosen, it is likely that Selwyn District Council would require a long term management plan and discharge consent, and the soils should be placed in areas underneath hardstanding or an appropriate amount of soil.
- Creating an encapsulation cell in an area of the site. Again this option will likely require a number of consents including land disturbance, deposition of contaminated soils to land, and a long term management plan and discharge consent. Additional testing of the contaminated material would also likely be required for the potential leaching of the material.
- Mixing of the contaminated material with other soils from on-site to dilute the concentrations. This option will require additional sampling to be undertaken of the mixed material to determine if dilution was successful. If the mixing is unsuccessful the volume of the impacted material to be managed / removed from site would have increased.

11 Recommendations

ENGEO recommend that a remedial strategy is developed to manage the soil that exceeds the NES for residential land use in the areas of the site identified in this report. The remedial strategy should be formulated in conjunction with the final development plans, including soil removal volumes and locations, and with the District and Regional Councils, so that the most appropriate, cost effective and sustainable approach can be implemented.

Due to the concentrations of the contaminants of concern around the burn pile areas, a resource consent for land disturbance and removal is not likely to be required during the site works. If a volume of soil exceeding 25 m^3 per 500 m^2 of development area is proposed to be disturbed, or if a volume of soil exceeding 5 m^3 per 500 m^3 of development area per year is proposed to be disposed of off-site, a consent should be obtained according to the requirements of the NES. Whether the work is to be undertaken under a consent or not, a site management plan is required to manage the risks to the on-site workers and the surrounding population and environment. An additional stormwater discharge consent may be required from Canterbury Regional Council for the duration of the redevelopment works on-site.

Information obtained during the investigation indicated that asbestos may be present within the buildings constructed on-site due to the construction pre-2000, and an asbestos survey should be carried out on the buildings to assess their condition before any demolition occurs. This will help Urban Estates to meet its obligations under the Health and Safety at Work (Asbestos) 2016 Regulations.

The conclusions and recommendations of this report are limited to the areas / depths of soil sampled. Therefore, there is the potential for unidentified hot spots of contamination to exist at the site. As previously sated, a site management plan (SMP) should outline procedures to identify and mitigate exposure to identified and unidentified contamination, if encountered during the redevelopment works.

11.1 Assessment of Environmental Effects

Based on the requirement of Section 88 of the Resource Management Act (RMA) and the framework set out in the Fourth Schedule of the RMA, the actual and potential effects associated with the proposed works are summarised in Table 24.

The environmental effects of the proposed plan change from rural residential / agricultural to residential are expected to have a no more than minor effect on the environment. Whilst elevated concentrations of concern are currently present on-site, following remediation, it is considered that the remaining site would have a less than minor impact on the receiving environment. Overall, it is considered that additional investigations and management controls may be required to address land contamination, but that these are able to be managed through the requirements of the NESCS prior to redevelopment works occurring and do not preclude the rezoning of the site as proposed.

Table 12: AEE from Redevelopment Works

Schedule Four Item	Assessment of Environmental Effects
Description of the proposal	The site area consisting 182 and 200 Hamptons Road is currently zoned as Inner Plains with the proposal designed to increase the residential density of the site.
Where the activity is likely to result in significant adverse effects, a description of the alternatives	Any actual or potential effects on the environment are likely to be less than minor. The elevated contaminants of concern at the site are not considered to be significant in relation to development works that are anticipated through the rezoning, and can be appropriately managed during redevelopment.
An assessment of the actual potential effects on the environment	Earthworks would be conducted in line with consent conditions in addition to the proposed mitigation measures detailed in a RAP. Potential for removal works to generate minor amounts of dust during the excavation and removal of impacted soil. Mitigation will involve utilising water to suppress dust and covering soil stockpiled on-site as well as all truckloads leaving the site. Potential for stormwater run-off to be contaminated if it encounters the impacted soil. Potential for noise generation from excavators. Contribution of site generated noise is unlikely to be significant and will be completed within typical working hours.
Where the activity includes the discharge of any contaminants, a description of: - Nature of the discharge - Sensitivity of the receiving environment - Alternative methods of discharge	No planned discharges. The site redevelopment will involve the removal of the identified contaminants of concern. Groundwater is not considered sensitive and therefore leaching to groundwater is likely to have a no more than minor impact.
Any effects on ecosystems, including plants or animals, physical disturbance of habitats in the vicinity	In accordance with the MfE (1999) Guidelines a Tier 1 ecological risk assessment has been conducted. No significant ecological receptors have been identified within close proximity of the site.

Schedule Four Item	Assessment of Environmental Effects
Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual or cultural, or other special values for present or future generation	No effects anticipated.
Description of the mitigation measures (safeguards and contingency plans) where relevant to be undertaken to help prevent or reduce actual or potential effect	A site management plan or remedial action plan is proposed to be issued and implemented during the redevelopment.
Where the scale or significance of the activity's effect are such that monitoring is required, a description of how, once the proposal is approved, effects will be monitored and by whom	Monitoring of site conditions and soil volumes is proposed.

12 References

ECan (2007a). *Background Concentrations of Selected Trace Elements in Canterbury Soils. Addendum 1: Additional Samples and Timaru Specific Background Levels.* Report prepared for Environment Canterbury by Tonkin & Taylor Limited, Christchurch, New Zealand. Report Number R07/1/2. Tonkin & Taylor Reference: 50875.003.

MfE (2002). *A Guide to the Management of Cleanfills*.

MfE (2011a). *Ministry for the Environment Hazardous Activities and Industries List.*

MfE (2011b). *Contaminated Land Management Guidelines No.1: Reporting on Contaminated Sites*.

MfE (2011c). *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values.*

MfE (2011d). *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*.

MfE (2011f). *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.*

MfE (2012). *Users' guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.*

WAMINZ. (2016). *Waste Management Institute New Zealand.* Technical Guidelines for Disposal to Land.

13 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Urban Estates Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by

Hazel Atkins, CEnvP

Senior Engineering / Environmental Geologist

Natalie Flatman

Environmental Consultant

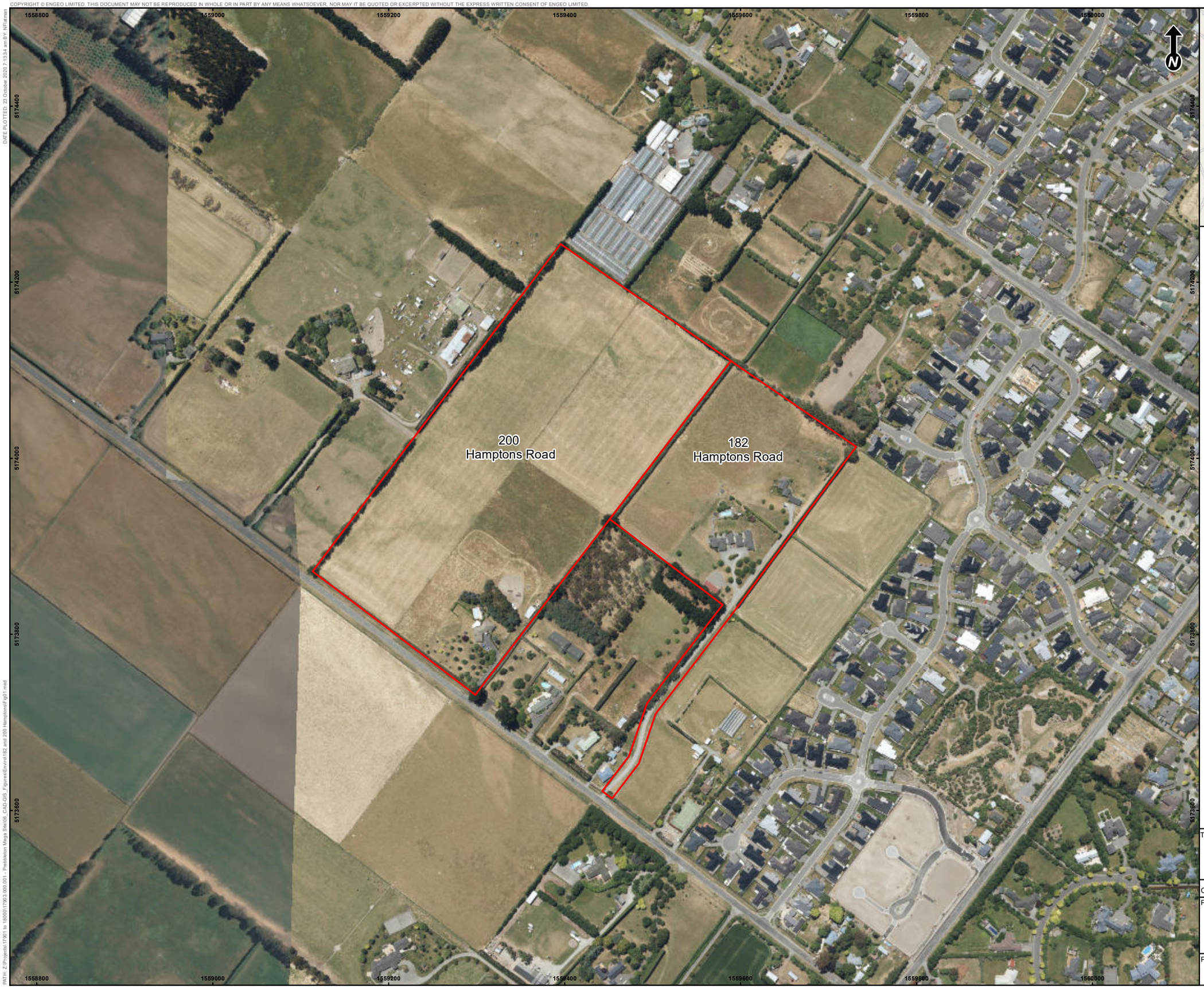
Report reviewed by

Dave Robotham, CEnvP SC

Principal Environmental Consultant

FIGURES

DATE PLOTTED: 23 October 2020 7:13:34 am BY: NFlatman



Legend

Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

0 50 100
Metres

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title: Site location plan

Client: Urban Estates		Figure No: 1
Project: 182 and 200 Hamptons Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.001	Scale: 1:4,000	Revision: A

PATH: Z:\Projects\17901 to 18000\17903.000.001 - Prebbleton Mega Site\06_CAD-GIS_Figures\Enviro\182 and 200 Hamptons\Fig01.mxd

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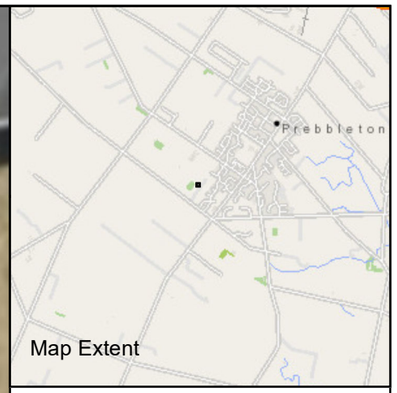

Legend

- Sample location
- Burn pile extent
- Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title:
182 Hamptons Road - Burn pile sample locations

Client: Urban Estates		Figure No: 2
Project: 182 and 200 Hamptons Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.001	Scale: 1:150	Revision: A

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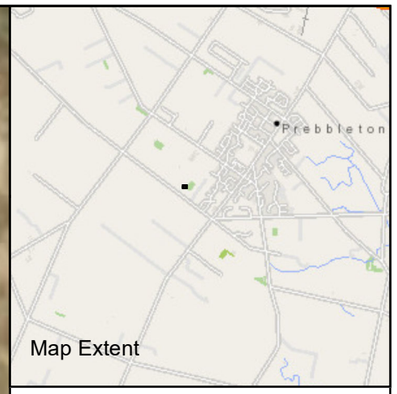

Legend

- Sample location
- Burn pile extent
- Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title:
200 Hamptons Road - Burn pile sample locations

Client: Urban Estates		Figure No: 3
Project: 182 and 200 Hamptons Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.001	Scale: 1:150	Revision: A

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APPENDIX 1:

Site Photographs

Photo 1: Main dwelling at 182 Hamptons Road

Photo 2: Second dwelling at 182 Hamptons Road

Photo 3: Small poultry offal pit to northwest of 182 dwelling

Photo 4: Stockpiled topsoil in northeastern extent of 182 Hamptons Road

Photo 5: Burn pile in southern paddock at 182 Hamptons Road

Photo 6: Paddocked area looking north

ENGEO
Expect Excellence

Date taken	Oct 2020	**Client**	**Urban Estates**		
Taken by	NF	**Project**	**182 and 200 Hamptons Road, Prebbleton**		
Approved by	DR	**Description**	**Site Photographs**		
Photo No.	1 to 6	**ENGEO Ref.**	17903	**Appendix Ref.**	1a

Photo 7: Dwelling at 200 Hamptons Road

Photo 8: Storage shed along eastern boundary at 200 Hamptons Road

Photo 9: Chicken coup area at 200 Hamptons Road

Photo 10: Burn pile at 200 Hamptons Road

Photo 11: Stock loading pen

Photo 12: Paddock area looking south

ENGEO
Expect Excellence

Date taken	Oct 2020	**Client**	**Urban Estates**		
Taken by	NF	**Project**	**182 and 200 Hamptons Road, Prebbleton**		
Approved by	DR	**Description**	**Site Photographs**		
Photo No.	7 to 12	**ENGEO Ref.**	17903	**Appendix Ref.**	1b

APPENDIX 2:

CRC LLUR 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

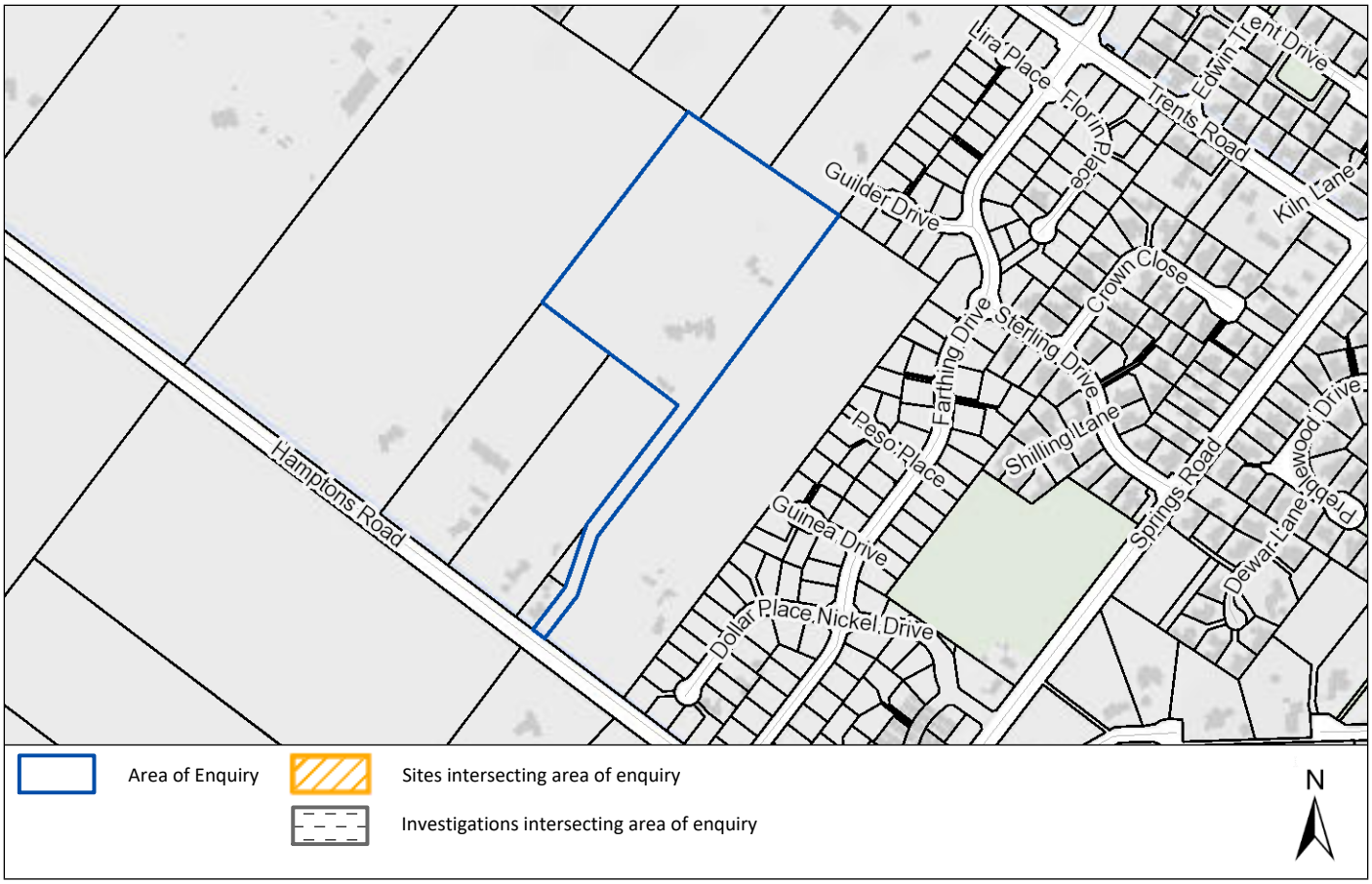
Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

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

www.ecan.govt.nz

Date:	08 October 2020
Land Parcels:	Lot 1 DP 404189 Valuation No(s): 2355201001



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:

There are no sites associated with the area of enquiry.

Information held about the sites on the Listed Land Use Register

There are no sites associated with the area of enquiry.

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 ENQ265248.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Listed Land Use Register

What you need to know

Everything is connected

What is the Listed Land Use Register (LLUR)?

The LLUR is a database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

Why do we need the LLUR?

Some activities and industries are hazardous and can potentially contaminate land or water. We need the LLUR to help us manage information about land which could pose a risk to your health and the environment because of its current or former land use.

Section 30 of the Resource Management Act (RMA, 1991) requires Environment Canterbury to investigate, identify and monitor contaminated land. To do this we follow national guidelines and use the LLUR to help us manage the information.

The information we collect also helps your local district or city council to fulfil its functions under the RMA. One of these is implementing the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil, which came into effect on 1 January 2012.

For information on the NES, contact your city or district council.

How does Environment Canterbury identify sites to be included on the LLUR?

We identify sites to be included on the LLUR based on a list of land uses produced by the Ministry for the Environment (MfE). This is called the Hazardous Activities and Industries List (HAIL)[1]. The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

We have two main ways of identifying HAIL sites:

- We are actively identifying sites in each district using historic records and aerial photographs. This project started in 2008 and is ongoing.
- We also receive information from other sources, such as environmental site investigation reports submitted to us as a requirement of the Regional Plan, and in resource consent applications.

[1] The Hazardous Activities and Industries List (HAIL) can be downloaded from MfE's website www.mfe.govt.nz, keyword search HAIL

How does Environment Canterbury classify sites on the LLUR?

Where we have identified a HAIL land use, we review all the available information, which may include investigation reports if we have them. We then assign the site a category on the LLUR. The category is intended to best describe what we know about the land use and potential contamination at the site and is signed off by a senior staff member.

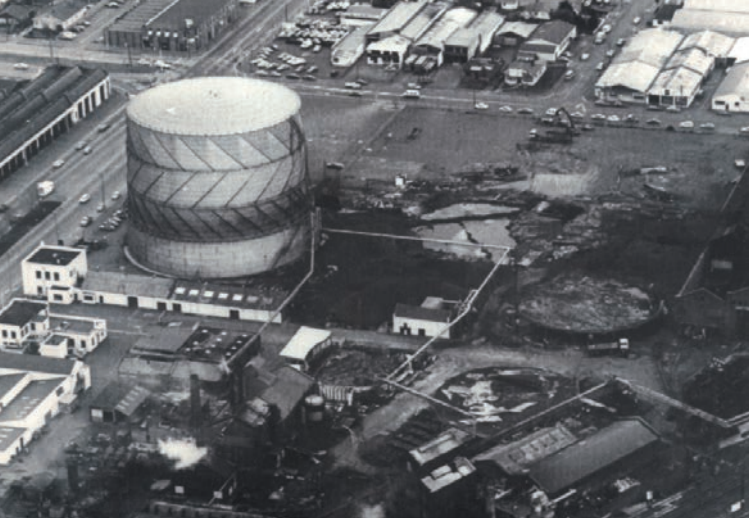
Please refer to the Site Categories and Definitions factsheet for further information.

What does Environment Canterbury do with the information on the LLUR?

The LLUR is available online at www.llur.ecan.govt.nz. We mainly receive enquiries from potential property buyers and environmental consultants or engineers working on sites. An inquirer would typically receive a summary of any information we hold, including the category assigned to the site and a list of any investigation reports.

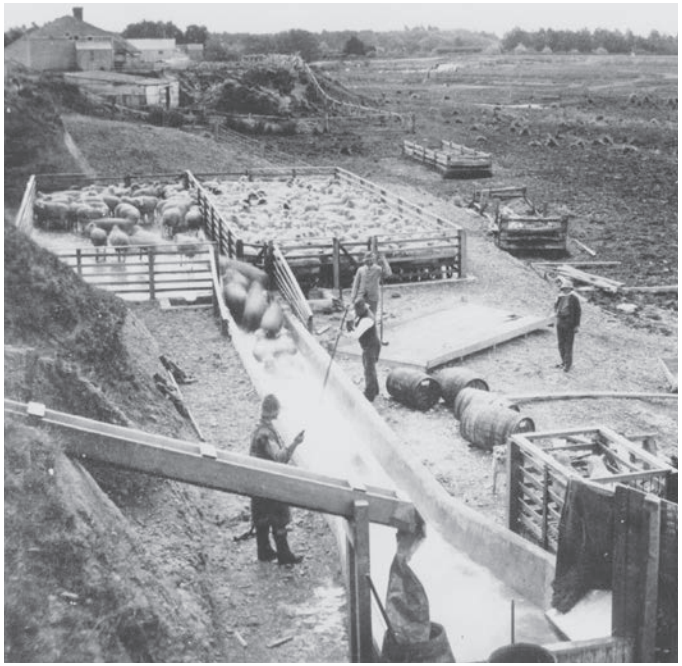
We may also use the information to prioritise sites for further investigation, remediation and management, to aid with planning, and to help assess resource consent applications. These are some of our other responsibilities under the RMA.

If you are conducting an environmental investigation or removing an underground storage tank at your property, you will need to comply with the rules in the Regional Plan and send us a copy of the report. This means we can keep our records accurate and up-to-date, and we can assign your property an appropriate category on the LLUR. To find out more, visit www.ecan.govt.nz/HAIL.



IMPORTANT!

The LLUR is an online database which we are continually updating. A property may not currently be registered on the LLUR, but this does not necessarily mean that it hasn't had a HAIL use in the past.



Sheep dipping (ABOVE) and gas works (TOP) are among the former land uses that have been identified as potentially hazardous. (Photo above by Wheeler & Son in 1987, courtesy of Canterbury Museum.)

My land is on the LLUR – what should I do now?

IMPORTANT! Just because your property has a land use that is deemed hazardous or is on the LLUR, it doesn't necessarily mean it's contaminated. The only way to know if land is contaminated is by carrying out a detailed site investigation, which involves collecting and testing soil samples.

You do not need to do anything if your land is on the LLUR and you have no plans to alter it in any way. It is important that you let a tenant or buyer know your land is on the Listed Land Use Register if you intend to rent or sell your property. If you are not sure what you need to tell the other party, you should seek legal advice.

You may choose to have your property further investigated for your own peace of mind, or because you want to do one of the activities covered by the National Environmental Standard for Assessing and Managing Contaminants in Soil. Your district or city council will provide further information.

If you wish to engage a suitably qualified experienced practitioner to undertake a detailed site investigation, there are criteria for choosing a practitioner on www.ecan.govt.nz/HAIL.

I think my site category is incorrect – how can I change it?

If you have an environmental investigation undertaken at your site, you must send us the report and we will review the LLUR category based on the information you provide. Similarly, if you have information that clearly shows your site has not been associated with HAIL activities (eg. a preliminary site investigation), or if other HAIL activities have occurred which we have not listed, we need to know about it so that our records are accurate.

If we have incorrectly identified that a HAIL activity has occurred at a site, it will be not be removed from the LLUR but categorised as Verified Non-HAIL. This helps us to ensure that the same site is not re-identified in the future.

Contact us

Property owners have the right to look at all the information Environment Canterbury holds about their properties.

It is free to check the information on the LLUR, online at www.llur.ecan.govt.nz.

If you don't have access to the internet, you can enquire about a specific site by phoning us on (03) 353 9007 or toll free on 0800 EC INFO (32 4636) during business hours.

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:
Calling from Christchurch: (03) 353 9007
Calling from any other area: 0800 EC INFO (32 4636)

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz E13/101

Listed Land Use Register

Site categories and definitions

When Environment Canterbury identifies a Hazardous Activities and Industries List (HAIL) land use, we review the available information and assign the site a category on the Listed Land Use Register. The category is intended to best describe what we know about the land use.

If a site is categorised as **Unverified** it means it has been reported or identified as one that appears on the HAIL, but the land use has not been confirmed with the property owner.

If the land use has been confirmed but analytical information from the collection of samples is not available, and the presence or absence of contamination has therefore not been determined, the site is registered as:

Not investigated:

- A site whose past or present use has been reported and verified as one that appears on the HAIL.
- The site has not been investigated, which might typically include sampling and analysis of site soil, water and/or ambient air, and assessment of the associated analytical data.
- There is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

If analytical information from the collection of samples is available, the site can be registered in one of six ways:

At or below background concentrations:

The site has been investigated or remediated. The investigation or post remediation validation results confirm there are no hazardous substances above local background concentrations other than those that occur naturally in the area. The investigation or validation sampling has been sufficiently detailed to characterise the site.

Below guideline values for:

The site has been investigated. Results show that there are hazardous substances present at the site but indicate that any adverse effects or risks to people and/or the environment are considered to be so low as to be acceptable. The site may have been remediated to reduce contamination to this level, and samples taken after remediation confirm this.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Managed for:

The site has been investigated. Results show that there are hazardous substances present at the site in concentrations that have the potential to cause adverse effects or risks to people and/or the environment. However, those risks are considered managed because:

- the nature of the use of the site prevents human and/or ecological exposure to the risks; and/or
- the land has been altered in some way and/or restrictions have been placed on the way it is used which prevent human and/or ecological exposure to the risks.

Partially investigated:

The site has been partially investigated. Results:

- demonstrate there are hazardous substances present at the site; however, there is insufficient information to quantify any adverse effects or risks to people or the environment; or
- do not adequately verify the presence or absence of contamination associated with all HAIL activities that are and/or have been undertaken on the site.

Significant adverse environmental effects:

The site has been investigated. Results show that sediment, groundwater or surface water contains hazardous substances that:

- have significant adverse effects on the environment; or
- are reasonably likely to have significant adverse effects on the environment.

Contaminated:

The site has been investigated. Results show that the land has a hazardous substance in or on it that:

- has significant adverse effects on human health and/or the environment; and/or
- is reasonably likely to have significant adverse effects on human health and/or the environment.

If a site has been included incorrectly on the Listed Land Use Register as having a HAIL, it will not be removed but will be registered as:

Verified non-HAIL:

Information shows that this site has never been associated with any of the specific activities or industries on the HAIL.

Please contact Environment Canterbury for further information:

(03) 353 9007 or toll free
on 0800 EC INFO (32 4636)
email ecinfo@ecan.govt.nz

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

E13/102

Environment Canterbury
Regional Council
Kaunihera Taiao ki Waitaha

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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:	08 October 2020	
Land Parcels:	Lot 1 DP 25129	Valuation No(s): 2355200600

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:

There are no sites associated with the area of enquiry.

Information held about the sites on the Listed Land Use Register

There are no sites associated with the area of enquiry.

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 ENQ265247.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Listed Land Use Register

What you need to know

Everything is connected

What is the Listed Land Use Register (LLUR)?

The LLUR is a database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

Why do we need the LLUR?

Some activities and industries are hazardous and can potentially contaminate land or water. We need the LLUR to help us manage information about land which could pose a risk to your health and the environment because of its current or former land use.

Section 30 of the Resource Management Act (RMA, 1991) requires Environment Canterbury to investigate, identify and monitor contaminated land. To do this we follow national guidelines and use the LLUR to help us manage the information.

The information we collect also helps your local district or city council to fulfil its functions under the RMA. One of these is implementing the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil, which came into effect on 1 January 2012.

For information on the NES, contact your city or district council.

How does Environment Canterbury identify sites to be included on the LLUR?

We identify sites to be included on the LLUR based on a list of land uses produced by the Ministry for the Environment (MfE). This is called the Hazardous Activities and Industries List (HAIL)[1]. The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

We have two main ways of identifying HAIL sites:

- We are actively identifying sites in each district using historic records and aerial photographs. This project started in 2008 and is ongoing.
- We also receive information from other sources, such as environmental site investigation reports submitted to us as a requirement of the Regional Plan, and in resource consent applications.

[1] The Hazardous Activities and Industries List (HAIL) can be downloaded from MfE's website www.mfe.govt.nz, keyword search HAIL

How does Environment Canterbury classify sites on the LLUR?

Where we have identified a HAIL land use, we review all the available information, which may include investigation reports if we have them. We then assign the site a category on the LLUR. The category is intended to best describe what we know about the land use and potential contamination at the site and is signed off by a senior staff member.

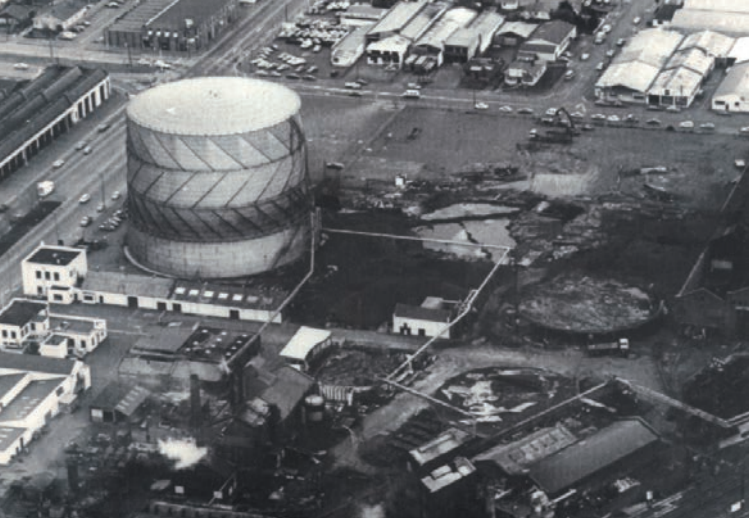
Please refer to the Site Categories and Definitions factsheet for further information.

What does Environment Canterbury do with the information on the LLUR?

The LLUR is available online at www.llur.ecan.govt.nz. We mainly receive enquiries from potential property buyers and environmental consultants or engineers working on sites. An inquirer would typically receive a summary of any information we hold, including the category assigned to the site and a list of any investigation reports.

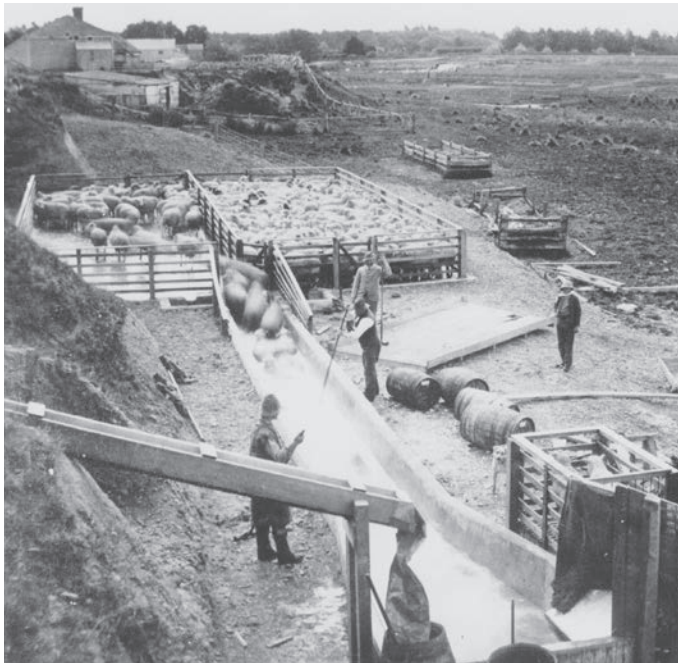
We may also use the information to prioritise sites for further investigation, remediation and management, to aid with planning, and to help assess resource consent applications. These are some of our other responsibilities under the RMA.

If you are conducting an environmental investigation or removing an underground storage tank at your property, you will need to comply with the rules in the Regional Plan and send us a copy of the report. This means we can keep our records accurate and up-to-date, and we can assign your property an appropriate category on the LLUR. To find out more, visit www.ecan.govt.nz/HAIL.



IMPORTANT!

The LLUR is an online database which we are continually updating. A property may not currently be registered on the LLUR, but this does not necessarily mean that it hasn't had a HAIL use in the past.



Sheep dipping (ABOVE) and gas works (TOP) are among the former land uses that have been identified as potentially hazardous. (Photo above by Wheeler & Son in 1987, courtesy of Canterbury Museum.)

My land is on the LLUR – what should I do now?

IMPORTANT! Just because your property has a land use that is deemed hazardous or is on the LLUR, it doesn't necessarily mean it's contaminated. The only way to know if land is contaminated is by carrying out a detailed site investigation, which involves collecting and testing soil samples.

You do not need to do anything if your land is on the LLUR and you have no plans to alter it in any way. It is important that you let a tenant or buyer know your land is on the Listed Land Use Register if you intend to rent or sell your property. If you are not sure what you need to tell the other party, you should seek legal advice.

You may choose to have your property further investigated for your own peace of mind, or because you want to do one of the activities covered by the National Environmental Standard for Assessing and Managing Contaminants in Soil. Your district or city council will provide further information.

If you wish to engage a suitably qualified experienced practitioner to undertake a detailed site investigation, there are criteria for choosing a practitioner on www.ecan.govt.nz/HAIL.

I think my site category is incorrect – how can I change it?

If you have an environmental investigation undertaken at your site, you must send us the report and we will review the LLUR category based on the information you provide. Similarly, if you have information that clearly shows your site has not been associated with HAIL activities (eg. a preliminary site investigation), or if other HAIL activities have occurred which we have not listed, we need to know about it so that our records are accurate.

If we have incorrectly identified that a HAIL activity has occurred at a site, it will be not be removed from the LLUR but categorised as Verified Non-HAIL. This helps us to ensure that the same site is not re-identified in the future.

Contact us

Property owners have the right to look at all the information Environment Canterbury holds about their properties.

It is free to check the information on the LLUR, online at www.llur.ecan.govt.nz.

If you don't have access to the internet, you can enquire about a specific site by phoning us on (03) 353 9007 or toll free on 0800 EC INFO (32 4636) during business hours.

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:
Calling from Christchurch: (03) 353 9007
Calling from any other area: 0800 EC INFO (32 4636)

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz E13/101

Listed Land Use Register

Site categories and definitions

When Environment Canterbury identifies a Hazardous Activities and Industries List (HAIL) land use, we review the available information and assign the site a category on the Listed Land Use Register. The category is intended to best describe what we know about the land use.

If a site is categorised as **Unverified** it means it has been reported or identified as one that appears on the HAIL, but the land use has not been confirmed with the property owner.

If the land use has been confirmed but analytical information from the collection of samples is not available, and the presence or absence of contamination has therefore not been determined, the site is registered as:

Not investigated:

- A site whose past or present use has been reported and verified as one that appears on the HAIL.
- The site has not been investigated, which might typically include sampling and analysis of site soil, water and/or ambient air, and assessment of the associated analytical data.
- There is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

If analytical information from the collection of samples is available, the site can be registered in one of six ways:

At or below background concentrations:

The site has been investigated or remediated. The investigation or post remediation validation results confirm there are no hazardous substances above local background concentrations other than those that occur naturally in the area. The investigation or validation sampling has been sufficiently detailed to characterise the site.

Below guideline values for:

The site has been investigated. Results show that there are hazardous substances present at the site but indicate that any adverse effects or risks to people and/or the environment are considered to be so low as to be acceptable. The site may have been remediated to reduce contamination to this level, and samples taken after remediation confirm this.

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Managed for:

The site has been investigated. Results show that there are hazardous substances present at the site in concentrations that have the potential to cause adverse effects or risks to people and/or the environment. However, those risks are considered managed because:

- the nature of the use of the site prevents human and/or ecological exposure to the risks; and/or
- the land has been altered in some way and/or restrictions have been placed on the way it is used which prevent human and/or ecological exposure to the risks.

Partially investigated:

The site has been partially investigated. Results:

- demonstrate there are hazardous substances present at the site; however, there is insufficient information to quantify any adverse effects or risks to people or the environment; or
- do not adequately verify the presence or absence of contamination associated with all HAIL activities that are and/or have been undertaken on the site.

Significant adverse environmental effects:

The site has been investigated. Results show that sediment, groundwater or surface water contains hazardous substances that:

- have significant adverse effects on the environment; or
- are reasonably likely to have significant adverse effects on the environment.

Contaminated:

The site has been investigated. Results show that the land has a hazardous substance in or on it that:

- has significant adverse effects on human health and/or the environment; and/or
- is reasonably likely to have significant adverse effects on human health and/or the environment.

If a site has been included incorrectly on the Listed Land Use Register as having a HAIL, it will not be removed but will be registered as:

Verified non-HAIL:

Information shows that this site has never been associated with any of the specific activities or industries on the HAIL.

Please contact Environment Canterbury for further information:

(03) 353 9007 or toll free
on 0800 EC INFO (32 4636)
email ecinfo@ecan.govt.nz

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

E13/102

APPENDIX 3:

Certificates of Titles

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

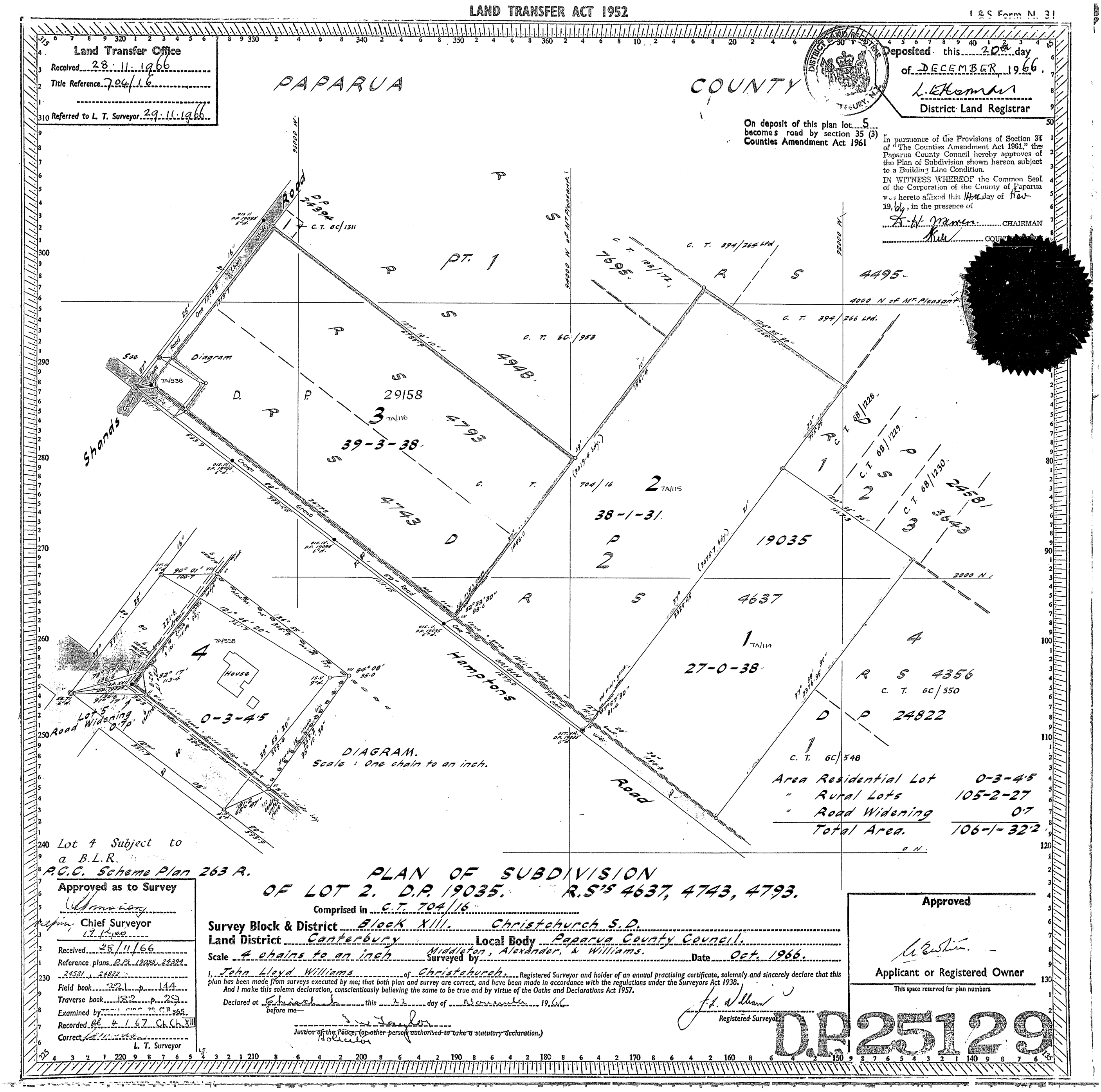
Identifier **CB7A/114**
Land Registration District **Canterbury**
Date Issued 20 December 1966

Prior References
CB704/16

Estate Fee Simple
Area 11.0226 hectares more or less
Legal Description Lot 1 Deposited Plan 25129
Registered Owners
John McCallum Marshall and Angela Gaye Marshall

Interests

8063985.2 Mortgage to Kiwibank Limited - 10.2.2009 at 2:05 pm


LAND TRANSFER ACT 1952
L&S Form N. 31
Land Transfer Office
Received 28.11.1966
Title Reference 704/16
Referred to L. T. Surveyor 29.11.1966
PAPARUA COUNTY
Deposited this 20th day of DECEMBER 1966
District Land Registrar
On deposit of this plan lot 5 becomes road by section 35 (3) Counties Amendment Act 1961
In pursuance of the Provisions of Section 34 of "The Counties Amendment Act 1961," the Paparua County Council hereby approves of the Plan of Subdivision shown hereon subject to a Building Line Condition.
IN WITNESS WHEREOF the Common Seal of the Corporation of the County of Paparua was hereto affixed this 14th day of Nov 1966, in the presence of
CHAIRMAN
Shands Road
Hamptons Road
Diagram
D.P. 29158
R.S. 4948
R.S. 4793
R.S. 4743
3 39-3-38
2 38-1-31
1 27-0-38
4 0-3-4·5
House
R.S. 4495
R.S. 4637
R.S. 4356
D.P. 19035
D.P. 24822
D.P. 24581
D.P. 7695
C.T. 6C/953
C.T. 704/16
C.T. 6C/550
C.T. 6C/548
4000 N of Mt Pleasant
2000 N
DIAGRAM. Scale: One chain to an inch.
Lot 5 Road Widening 0.7p
Area Residential Lot 0-3-4·5
Rural Lots 105-2-27
Road Widening 0·7
Total Area. 106-1-32·2
Lot 4 Subject to a B.L.R.
P.C.C. Scheme Plan 263 R.
PLAN OF SUBDIVISION OF LOT 2. D.P. 19035. R.S.'s 4637, 4743, 4793.
Comprised in C.T. 704/16
Survey Block & District Block XIII. Christchurch S.D.
Land District Canterbury Local Body Paparua County Council.
Scale 4 chains to an inch Surveyed by Middleton, Alexander, & Williams. Date Oct. 1966.
I, John Lloyd Williams of Christchurch, Registered Surveyor and holder of an annual practising certificate, solemnly and sincerely declare that this plan has been made from surveys executed by me; that both plan and survey are correct, and have been made in accordance with the regulations under the Surveyors Act 1938. And I make this solemn declaration, conscientiously believing the same to be true and by virtue of the Oaths and Declarations Act 1957.
Declared at Christchurch this 22 day of November 1966 before me—
Justice of the Peace, (or other person authorised to take a statutory declaration.)
Solicitor
Registered Surveyor
Approved as to Survey
Chief Surveyor
Received 28/11/66
Field book 221 p. 144
Traverse book 182 p. 29
L. T. Surveyor
Approved
Applicant or Registered Owner
This space reserved for plan numbers
D.P. 25129

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

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

Identifier **414491**

Land Registration District **Canterbury**

Date Issued 16 June 2009

Prior References
277692

Estate Fee Simple

Area 4.3901 hectares more or less

Legal Description Lot 1 Deposited Plan 404189

Original Registered Owners

Mark David Larson, Catherine Anne Larson and Canterbury Trustees (2004) Limited

---

Interests

Subject to a right way, a right to drain sewage and water and a right to convey water, electric power and telephonic communications over part marked A,B and C on DP 404189 created by Easement Instrument 6823837.3 - 11.4.2006 at 9:00 am

The easements created by Easement Instrument 6823837.3 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to convey electricity over part herein marked B and D on DP 404189 in favour of Orion New Zealand Limited created by Transfer 7308724.2 - 4.4.2007 at 9:00 am

7585157.1 Bond pursuant to Section 108(2)(b) Resource Management Act 1991 Selwyn District Council - 19.10.2007 at 9:00 am

7107733.1 Mortgage to ASB Bank Limited - 16.11.2006 at 9:43 am

7478545.1 Variation of Mortgage 7107733.1 - 26.7.2007 at 9:00 am

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

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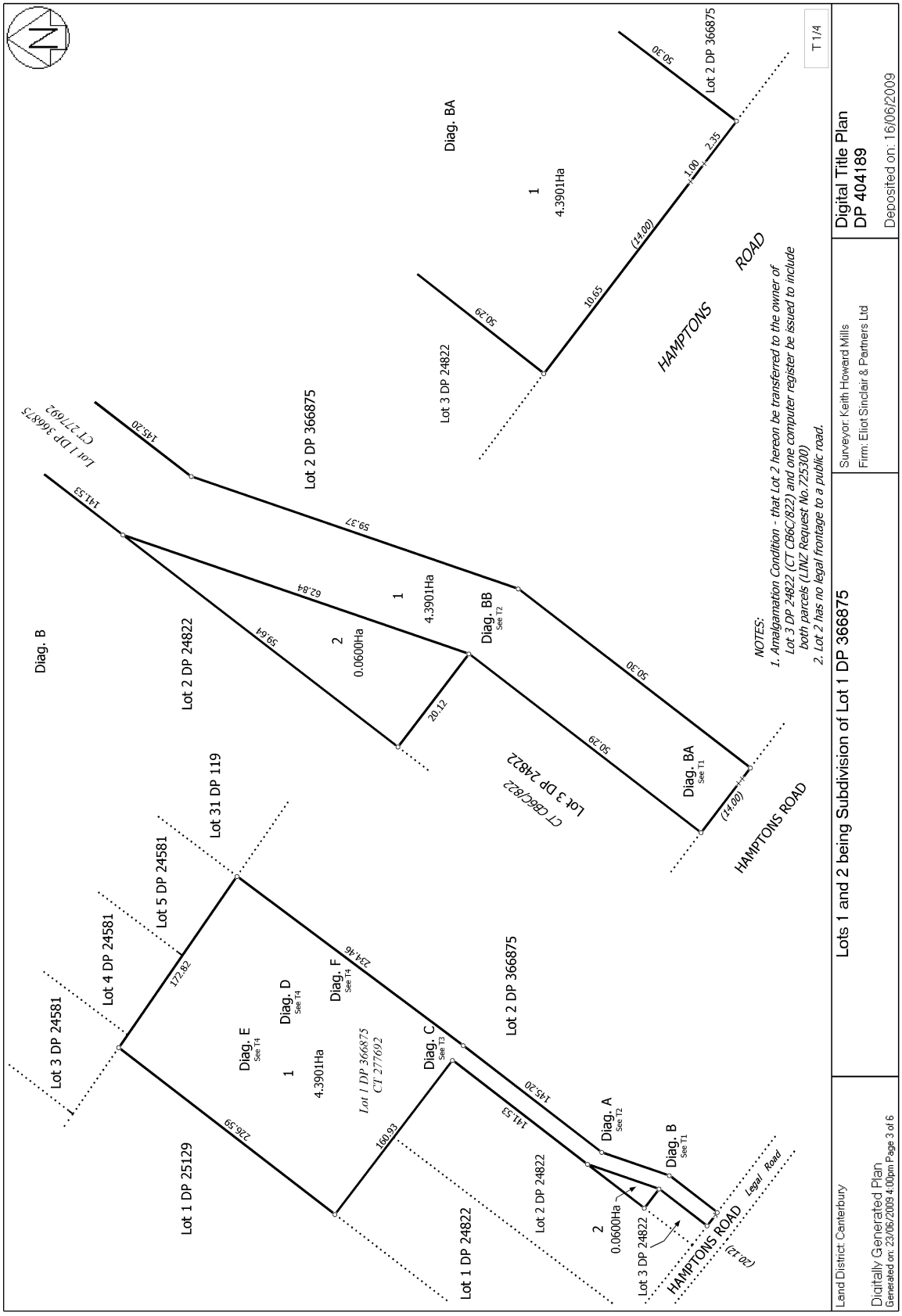
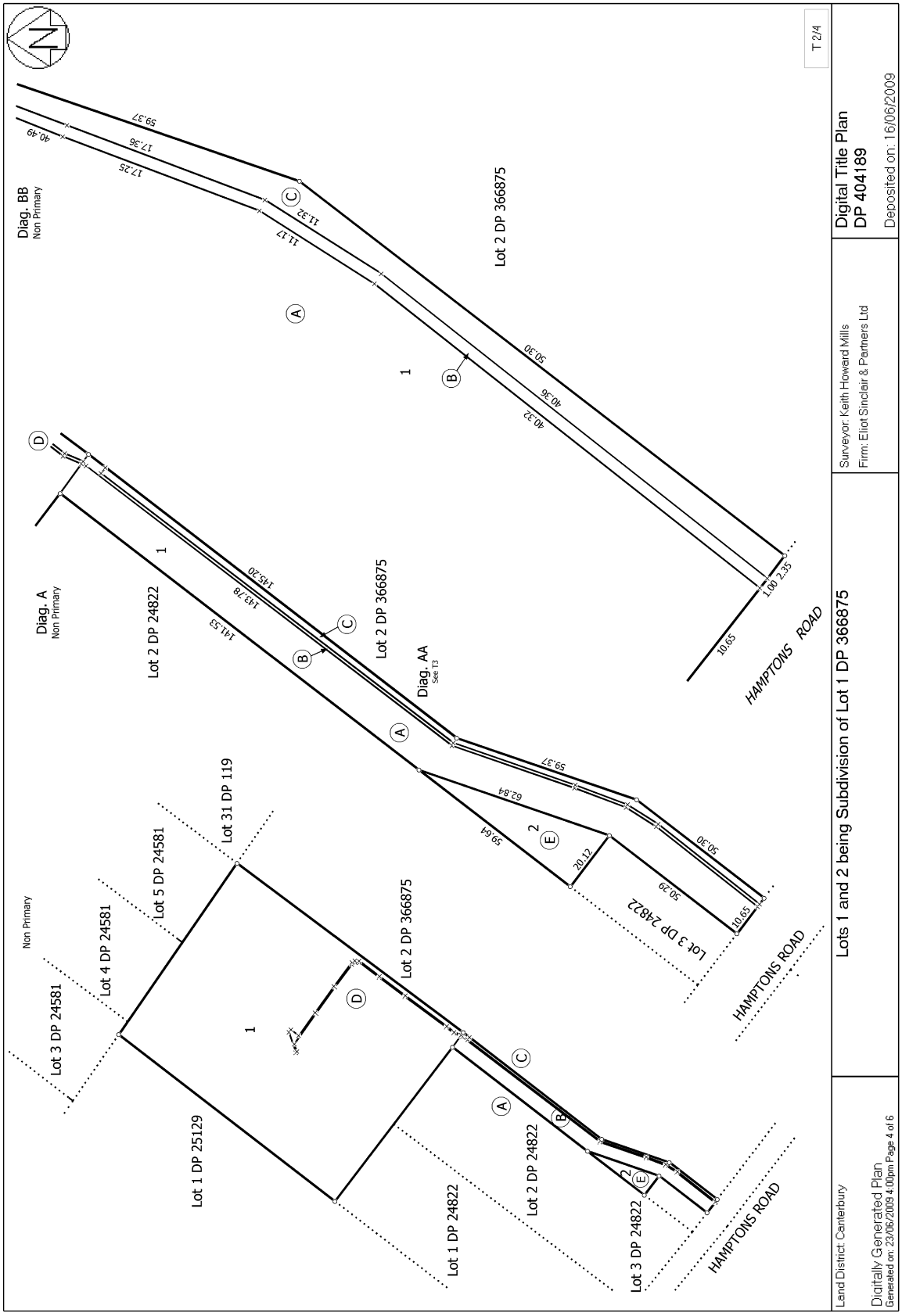
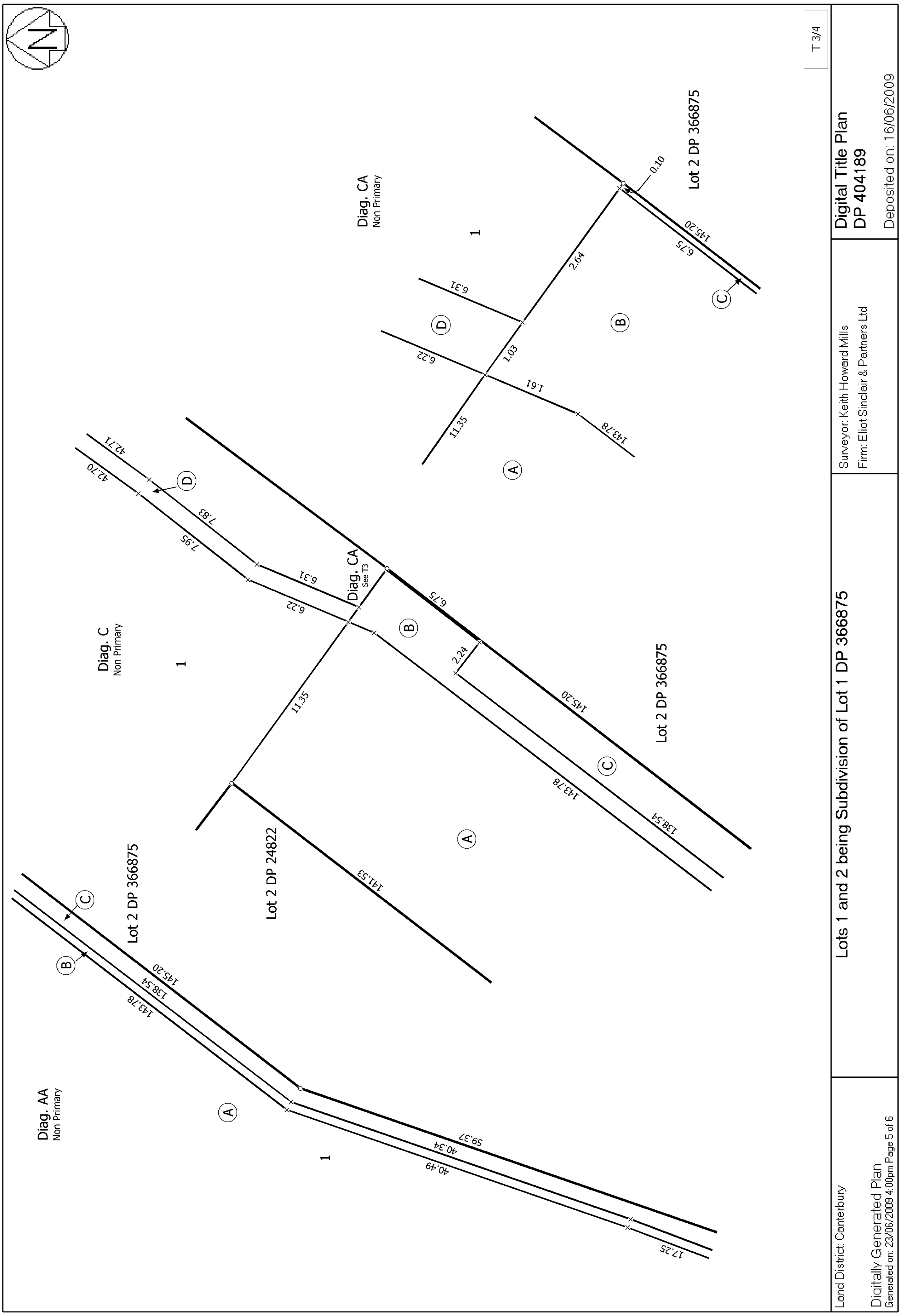

Lot 1 and 2 being Subdivision of Lot 1 DP 366875
Digital Title Plan
DP 404189
Deposited on: 16/06/2009
Land District: Canterbury
Digitally Generated Plan
Generated on: 23/06/2009 4:00pm Page 3 of 6
Surveyor: Keith Howard Mills
Firm: Eliot Sinclair & Partners Ltd
T 1/4
NOTES:
1. Amalgamation Condition - that Lot 2 hereon be transferred to the owner of Lot 3 DP 24822 (CT CB6C/822) and one computer register be issued to include both parcels (LINZ Request No.725300)
2. Lot 2 has no legal frontage to a public road.
HAMPTONS ROAD
Lot 2 DP 366875
Lot 3 DP 24822
Diag. BA
1
4.3901Ha
50.30
2.35
1.00
(14.00)
10.65
50.29
Diag. BB
See T2
Diag. B
Lot 2 DP 24822
Lot 1 DP 366875
CT 277692
145.20
59.37
141.53
62.84
59.64
2
0.0600Ha
20.12
50.29
50.30
Diag. BA
See T1
Lot 3 DP 24822
CT CB6C/822
(14.00)
Lot 31 DP 119
Lot 5 DP 24581
Lot 4 DP 24581
Lot 3 DP 24581
172.82
Diag. E
See T4
Diag. D
See T4
Diag. F
See T4
234.46
1
4.3901Ha
Lot 1 DP 366875
CT 277692
Diag. C
See T3
Lot 2 DP 366875
236.59
160.93
145.20
141.53
Diag. A
See T2
Diag. B
See T1
Lot 1 DP 25129
Lot 1 DP 24822
Lot 2 DP 24822
2
0.0600Ha
Lot 3 DP 24822
HAMPTONS ROAD
Legal Road
(20.12)


T 2/4
Digital Title Plan
DP 404189
Deposited on: 16/06/2009
Surveyor Keith Howard Mills
Firm: Eliot Sinclair & Partners Ltd
Lots 1 and 2 being Subdivision of Lot 1 DP 366875
Land District Canterbury
Digitally Generated Plan
Generated on: 23/06/2009 4:00pm Page 4 of 6
Diag. BB
Non Primary
Diag. A
Non Primary
Diag. AA
See T3
Lot 2 DP 366875
Lot 2 DP 24822
Lot 3 DP 24822
Lot 3 DP 24581
Lot 4 DP 24581
Lot 5 DP 24581
Lot 31 DP 119
Lot 1 DP 25129
Lot 1 DP 24822
HAMPTONS ROAD
59.37
40.49
17.36
17.25
11.32
11.17
50.30
40.36
40.32
1.00
2.35
10.65
145.20
143.78
141.53
62.84
59.64
20.12
50.29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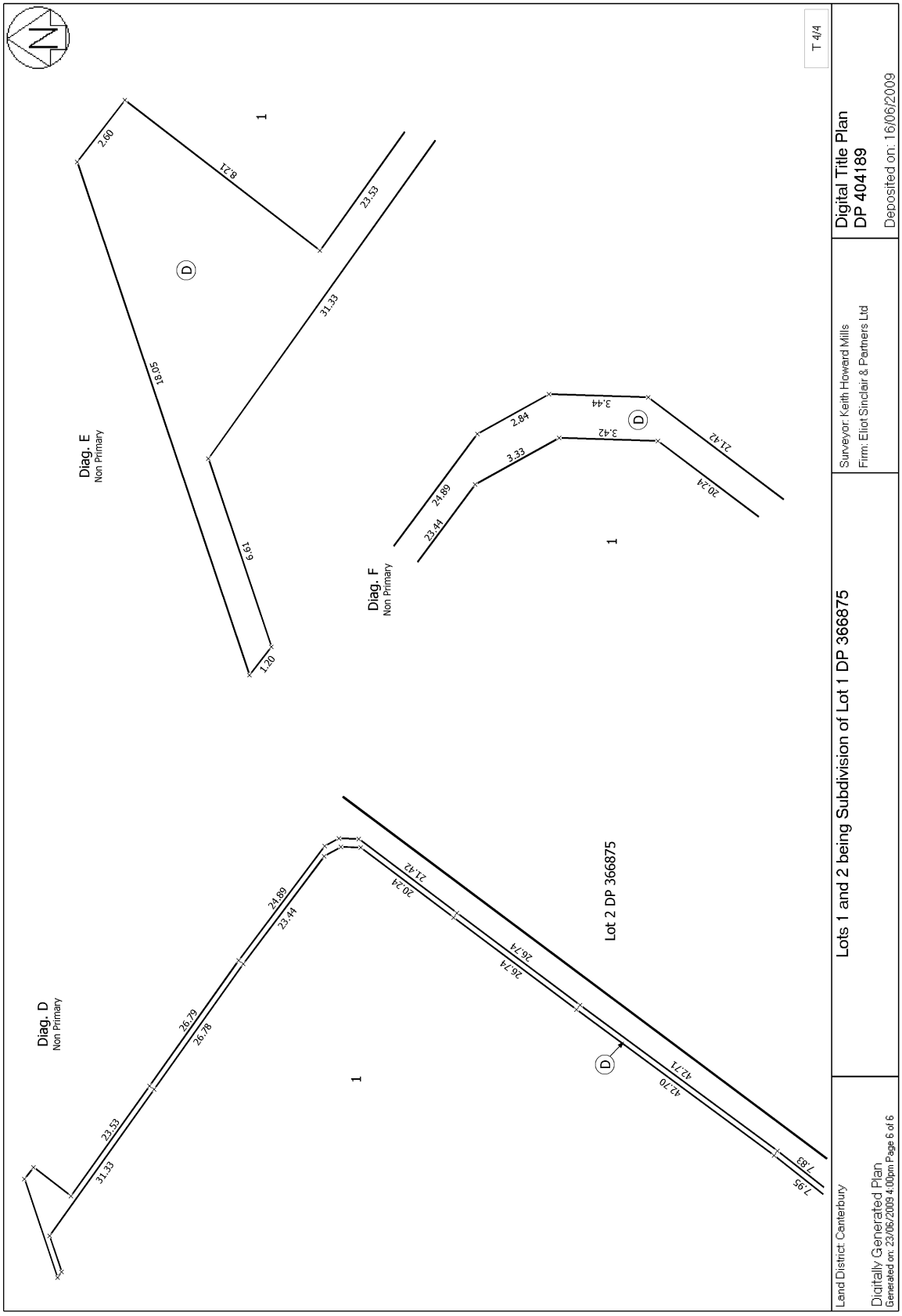
Digitally Generated Plan
Generated on: 23/06/2009 4:00pm Page 5 of 6
T 3/4
Diag. CA
Non Primary
Diag. C
Non Primary
Diag. CA
See T3
Diag. AA
Non Primary
Lot 2 DP 366875
Lot 2 DP 24822
1
A
B
C
D
145.20
138.54
143.78
141.53
59.37
40.34
40.49
17.25
11.35
6.75
6.31
6.22
7.83
7.95
42.71
42.70
2.24
2.64
1.03
1.61
0.10


T 4/4
Digital Title Plan
DP 404189
Deposited on: 16/06/2009
Surveyor Keith Howard Mills
Firm: Eliot Sinclair & Partners Ltd
Lots 1 and 2 being Subdivision of Lot 1 DP 366875
Land District: Canterbury
Digitally Generated Plan
Generated on: 23/06/2009 4:00pm Page 6 of 6
Diag. E
Non Primary
Diag. F
Non Primary
Diag. D
Non Primary
Lot 2 DP 366875
2.60
8.21
23.53
31.33
18.05
19.9
1.20
3.44
2.84
3.42
3.33
24.89
23.44
21.42
20.24
26.74
42.70
42.71
7.83
7.85
26.79
26.78
1

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

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

Identifier **CB7A/114**

Land Registration District **Canterbury**

Date Issued 20 December 1966

Prior References
CB704/16

Estate Fee Simple

Area 11.0226 hectares more or less

Legal Description Lot 1 Deposited Plan 25129

Original Registered Owners
John McCallum Marshall and Angela Gaye Marshall

Interests

A131071.3 Mortgage to Trust Bank Canterbury Limited - 26.8.1994 at 12.00 pm

7095691.1 Application pursuant to Section 99A Land Transfer Act 1952 vesting Mortgage A131071.3 in Westpac New Zealand Limited - 2.11.2006 at 9:00 am

8063985.1 Discharge of Mortgage A131071.3 - 10.2.2009 at 2:05 pm

8063985.2 Mortgage to Kiwibank Limited - 10.2.2009 at 2:05 pm

References
Prior C/T. 704/16

Transfer No.
N/C. Order No. 704830

REGISTER

Land and Deeds 69

No. 7A/114

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 20th day of December one thousand nine hundred and sixty six under the seal of the District Land Registrar of the Land Registration District of Canterbury

WITNESSETH that ALFRED ERNEST WHITE of Christchurch Farmer

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be several admeasurements a little more or less, that is to say: All that parcel of land containing 27 acres 38 perches or thereabouts situated in Block XIII of the Christchurch Survey District being Lot 1 on Deposited Plan No. 25129 part of Rural Section 4637

DISTRICT LAND REGISTRAR CANTERBURY

Assistant Land Registrar

Mortgage 732759 to Wilfred Athelstane White and Philip Maxwell MacShane - 12.3.1968 at 2.30p.m. DISCHARGED 10/9/1971 A.L.R. A.L.R.

a one tenth share in Transfer 806940 of Mortgage 732759 to Wilfred Athelstane White - 27/8/1970 at 12.25 p.m A.L.R.

Transmission 23648/1 to Sadie May White of Christchurch, Widow as Survivor - 30.1.1975 at 2.01 p.m A.L.R.

Transfer 27758/1 to Sadie May White above-named - 7.3.1975 at 10.49 a.m. A.L.R.

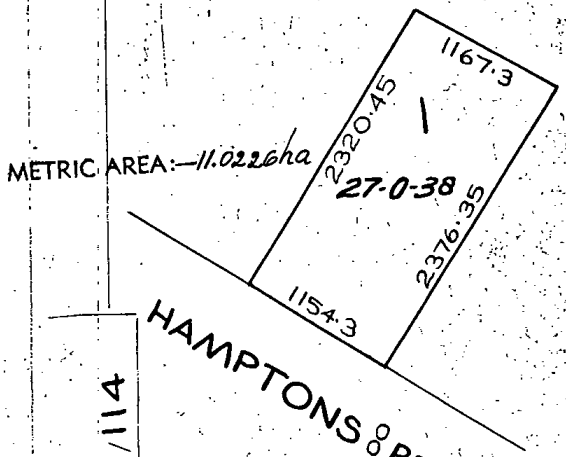
~~Transfer 53531/1 of a one-half share Creed~~.

Transfer 53531/1 to Penelope Rodger Allen of Christchurch, Married Woman - 3.10.1975 at 2.15 p.m.

Mortgage 53531/2 to Sadie May White - 3.10.1975 at 2.15 p.m. DISCHARGED A.L.R. 560/31 A.L.R.

Variation of Mortgage 53531/2 - 28.4.1976 at 1.43 p.m. A.L.R.

10,000/7/66—22549 W



METRIC AREA:—11.022ha

Scale: 1 inch = 10 chains

No. 7A/114

C.T. 7A/114

Variation of Mortgage 53531/2 - 25.3.1977 at 11.25 a.m. for A.L.R.

Variation of Mortgage 53531/2 - 12.5.1978 at 10.02 am.

for A.L.R.

Variation of Mortgage 53531/2 - 12.4.1979 at 11.27 a.m.

for A.L.R.

Variation of Mortgage 53531/2 - 18.4.1980 at 10.22 a.m.

for A.L.R.

Variation of Mortgage 53531/2 - 22.5.1981 at 10.18 a.m.

for A.L.R.

Variation of Mortgage 53531/2 - 10.5.1982 at 10.52 a.m.

for A.L.R.

Transfer A131071/1 to John McCallum Marshall, Aircraft Engineer and Angela Gaye Marshall, Teacher, both of Christchurch - 26.8.1994 at 12.00pm

for A.L.R.

Mortgage A131071/3 to Trust Bank Canterbury Limited - 26.8.1994 at 12.00pm

for A.L.R.

APPENDIX 4:

Laboratory Certificates

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:	Engeo Limited	**Lab No:**	2455982 SPv1
Contact:	Natalie Flatman C/- Engeo Limited PO Box 373 Christchurch 8140	**Date Received:**	15-Oct-2020
		Date Reported:	19-Oct-2020
		Quote No:	107705
		Order No:	
		Client Reference:	P2020.002.259_182
		Submitted By:	Natalie Flatman

Sample Type: Soil

Sample Name:		182_A1S1 14-Oct-2020	182_A1S2 14-Oct-2020	182_A1S3 14-Oct-2020	182_A1S4 14-Oct-2020	182_A1S5 14-Oct-2020
Lab Number:		2455982.1	2455982.2	2455982.3	2455982.4	2455982.5
Individual Tests						
Dry Matter	g/100g as rcvd	85	-	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	540	23	4	5	10
Total Recoverable Cadmium	mg/kg dry wt	2.2	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	260	21	14	15	16
Total Recoverable Copper	mg/kg dry wt	460	24	5	5	9
Total Recoverable Lead	mg/kg dry wt	62	17.7	15.5	15.5	15.2
Total Recoverable Nickel	mg/kg dry wt	16	9	9	9	9
Total Recoverable Zinc	mg/kg dry wt	600	75	54	55	54
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.4	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	0.060	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	0.050	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.012	-	-	-	-
Acenaphthene	mg/kg dry wt	< 0.012	-	-	-	-
Anthracene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.03	-	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.03	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.012	-	-	-	-
Chrysene	mg/kg dry wt	< 0.012	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.012	-	-	-	-
Fluoranthene	mg/kg dry wt	< 0.012	-	-	-	-
Fluorene	mg/kg dry wt	0.018	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.012	-	-	-	-
Naphthalene	mg/kg dry wt	0.22	-	-	-	-
Perylene	mg/kg dry wt	< 0.012	-	-	-	-
Phenanthrene	mg/kg dry wt	0.050	-	-	-	-
Pyrene	mg/kg dry wt	< 0.012	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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%.	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-5
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	1
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	1
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	1
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	1

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

Testing was completed between 16-Oct-2020 and 19-Oct-2020. 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.

Carole Rodgers-Carroll BA, NZCS
Client Services Manager - Environmental

Hill Laboratories
TRIED, TESTED AND TRUSTED

ANALYSIS REQUEST

R J Hill Laboratories Limited
28 Duke Street, Hamilton 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

Job No: 245 5982
Date Recv: 15-Oct-20 10:15
Received by: Isaac Broadbent
3124559822

Quote No

Primary Contact Natalie Flatman

Submitted By Natalie Flatman

Client Name ENGEO Ltd

Address 124 Montreal Street, Sydenham

Christchurch *Postcode* 8023

Phone 033289012 *Mobile* 0273350114

Email nflatman@engeo.co.nz

Charge To ENGEO Ltd

Client Reference P2020.001.259_182

Order No

Results To *Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.*

☑ *Email Primary Contact* ☐ *Email Submitter* ☐ *Email Client*

☐ *Email Other*

☐ *Other*

ADDITIONAL INFORMATION

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories
Date & Time: 14/10/20 4:00pm
Name: N Flatman
☐ *Tick if you require COC to be emailed back*
Signature:

Received at Hill Laboratories
Date & Time:
Name:
Signature:

Condition ☐ *Room Temp* ☐ *Chilled* ☐ *Frozen* Temp: 4

☐ *Sample and Analysis details checked*
Signature:

Priority ☐ Low ☑ Normal ☐ High
☐ **Urgent** (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	182_AIS1	14/10/20		ES	PAHs & heavy metals
2	182_AIS2	↓		↓	Heavy metals
3	182_AIS3				↓
4	182_AIS4				
5	182_AIS5				
6					
7					
8					
9					
10					
11					
12					

Continued on next page

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:	Engeo Limited	**Lab No:**	2455985 SPv1
Contact:	Natalie Flatman C/- Engeo Limited PO Box 373 Christchurch 8140	**Date Received:**	15-Oct-2020
		Date Reported:	19-Oct-2020
		Quote No:	107705
		Order No:	
		Client Reference:	P2020.002.259_200
		Submitted By:	Natalie Flatman

Sample Type: Soil

Sample Name:		200_A1S1 14-Oct-2020	200_A1S2 14-Oct-2020	200_A1S3 14-Oct-2020	200_A1S4 14-Oct-2020	200_A1S5 14-Oct-2020
Lab Number:		2455985.1	2455985.2	2455985.3	2455985.4	2455985.5
Individual Tests						
Dry Matter	g/100g as rcvd	86	-	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	34	31	31	41	14
Total Recoverable Cadmium	mg/kg dry wt	0.51	0.51	0.33	1.71	0.31
Total Recoverable Chromium	mg/kg dry wt	101	32	29	55	19
Total Recoverable Copper	mg/kg dry wt	65	48	40	69	19
Total Recoverable Lead	mg/kg dry wt	99	50	39	340	44
Total Recoverable Nickel	mg/kg dry wt	11	9	10	13	8
Total Recoverable Zinc	mg/kg dry wt	280	188	150	1,480	101
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.8	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	0.049	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	0.057	-	-	-	-
Acenaphthylene	mg/kg dry wt	0.012	-	-	-	-
Acenaphthene	mg/kg dry wt	0.013	-	-	-	-
Anthracene	mg/kg dry wt	0.021	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	0.024	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.03	-	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.03	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.027	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	0.033	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.020	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.012	-	-	-	-
Chrysene	mg/kg dry wt	0.021	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.012	-	-	-	-
Fluoranthene	mg/kg dry wt	0.077	-	-	-	-
Fluorene	mg/kg dry wt	0.034	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.016	-	-	-	-
Naphthalene	mg/kg dry wt	0.06	-	-	-	-
Perylene	mg/kg dry wt	< 0.012	-	-	-	-
Phenanthrene	mg/kg dry wt	0.165	-	-	-	-
Pyrene	mg/kg dry wt	0.139	-	-	-	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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%.	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-5
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	1
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	1
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	1
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	1

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

Testing was completed between 16-Oct-2020 and 19-Oct-2020. 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.

Carole Rodgers-Carroll BA, NZCS
Client Services Manager - Environmental

Hill Laboratories
TRIED, TESTED AND TRUSTED

ANALYSIS REQUEST

R J Hill Laboratories Limited
28 Duke Street, Hamilton 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

Job No: **245 5985**

Date Recv: 15-Oct-20 10:17

Received by: Isaac Broadbent

3124559859

Quote No

Primary Contact Natalie Flatman

Submitted By Natalie Flatman

Client Name ENGEO Ltd

Address 124 Montreal Street, Sydenham

Christchurch *Postcode* 8023

Phone 033289012 *Mobile* 0273350114

Email nflatman@engeo.co.nz

Charge To ENGEO Ltd

Client Reference P2020.002.259_200

Order No

Results To *Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.*

☑ *Email Primary Contact* ☐ *Email Submitter* ☐ *Email Client*

☐ *Email Other*

☐ *Other*

ADDITIONAL INFORMATION

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 14/10/20 4:00pm

Name: N Flatman

☐ *Tick if you require COC to be emailed back*

Signature:

Received at Hill Laboratories

Date & Time:

Name:

Signature:

Condition ☐ *Room Temp* ☐ *Chilled* ☐ *Frozen* Temp: 4

☐ *Sample and Analysis details checked*

Signature:

Priority ☐ Low ☑ Normal ☐ High

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

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	200_AIS1	14/10/20		ES	PAHs & heavy metals
2	200_AIS2	↓		↓	Heavy metals
3	200_AIS3				↓
4	200_AIS4				
5	200_AIS5				
6					
7					
8					
9					
10					
11					
12					

Continued on next page

ENGEO

Celebrating 10 YEARS IN NZ

Combined Preliminary and Detailed Site Investigation

232 and 250 Hamptons Road and 340 Trents Road

Prebbleton

Canterbury

Submitted to:

Urban Estates Limited

ENGEO Limited
124 Montreal Street, Sydenham, Christchurch 8023
PO Box 373, Christchurch 8140, New Zealand
Tel +64 3 328 9012 Fax +64 3 328 9013
www.engeo.co.nz

23.10.2020
17903.000.001_03

ACENZ

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Appendices

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Appendix 2: CRC LLUR Statement

Appendix 3: Certificate of Titles – 250 Hamptons Road

Appendix 4: Laboratory Certificates

ENGEO Document Control:

Report Title	Combined Preliminary and Detailed Site Investigation - 232 and 250 Hamptons Road and 340 Trents Road, Prebbleton			
Project No.	17903.000.001	Doc ID	03	
Client	Urban Estates Limited	Client Contact	Justin McDonald	
Distribution (PDF)	Urban Estates Limited			
Date	Revision Details/Status	WP	Author	Reviewer
23/10/2020	Issued to Client	DF	HA	DR

1 Introduction

ENGEO Ltd was requested by Urban Estates Limited to undertake a combined Preliminary and Detailed Site Investigation (PSI / DSI) of the property at 232, 250 Hamptons Road and 340 Trents Road in Prebbleton, Canterbury (herein referred to as 'the site'). This work has been carried out in accordance with our signed agreement dated 10 October 2020 (P2020.002.259). The investigation area is shown in Figure 1. ENGEO understands that the site is to undergo a plan change for residential land use, with eventual residential subdivision which will likely involve soil disturbance and require information on the suitability of the site and soil quality.

This PSI / DSI was completed in order to satisfy Selwyn District Council (SDC) requirements in relation to the plan change assessment and for potential future subdivision requirements in accordance with the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES).

This PSI / DSI was undertaken in general accordance with the MfE 2011 Contaminated Land Management Guidelines (CLMG) No.5: Guidelines for Site Investigation and Site Analysis of Soil and reported in general accordance with the MfE 2011 CLMG No.1: Reporting on Contaminated Sites in New Zealand.

A separate PSI has previously been completed by ENGEO (ENGEO, 2020) for the land at 232 Hamptons Road and 340 Trents Road, with this report just detailing the PSI desktop information for 250 Hamptons Road, a summary of the PSI for the other areas, and then the intrusive work for 232, 250 Hamptons Road and 340 Trents Road. It is recommended that the previous report is read in conjunction with this report.

1.1 Objective of the Assessment

The objectives of this assessment were to:

- Evaluate and identify conditions of releases and threatened releases of hazardous substances on, at, in or to the subject property;
- Evaluate the presence and extent of identified contaminants of concern (COC) at the site; and
- Assess whether the COCs pose an unacceptable risk to human health or the environment for the proposed plan change and future potential subdivision.

1.2 Approach

To satisfy the objectives, ENGEO sought to gather information regarding the following:

- Current and past property uses and occupancies;
- Current and past uses of hazardous substances;
- Waste management and disposal activities that could have caused a release or threatened release of hazardous substances;
- Current and past corrective actions and response activities to address past and ongoing releases of hazardous substances at the subject property;

- Properties adjoining or located near the subject property that have environmental conditions that could have resulted in conditions indicative of releases or threatened releases of hazardous substances to the subject property; and
- COC concentrations within the soils underlying the site.

2 Site Description and Setting

The total site area is 30.4 ha, with the legal identifier Lot 2 DP 41505, Lot 2 DP 25129, Lot 2 DP 29158 and Lot 2 DP 42643. It is located at 250 Hamptons Road in Prebbleton. The site is currently being used for mixed residential and agricultural use. ENGEO understands that the site is to be re-zoned for future potential residential subdivision.

Site information is summarised in Table 1 with photographs of the site taken during the site walkover provided in Appendix 1.

Table 1: Site Information

Item	Description		
Location	232 Hamptons Road	250 Hamptons Road	340 Trents Road
Legal Description	Lot 2 DP 41505 and Lot 2 DP 25129	Lot 2 DP 29158	Lot 2 DP 42643
Current Land Use	Residential areas present on all sites with agricultural grazing undertaken in the paddocks areas.		
Proposed Land Use	Residential		
Building Construction and Use	Dwelling: Concrete foundation, concrete, breeze block and metal with decramastic coated cladding, metal joinery, metal roof. Stables: Concrete foundation, timber and metal cladding, metal roof. Large storage shed: Concrete and open earth ground	Dwelling: Concrete foundation, brick cladding, metal joinery and roof. Garage: Concrete floor, timber cladding, metal roof.	Dwelling: Concrete ring foundation, brick cladding, metal roof. Garage near dwelling: Cement board cladding, metal roof. Barn: Metal cladding and roof.
Site Area	19.83 ha	8.09 ha	2.48 ha
Territorial Authority	Selwyn District Council		
Zoning	IP – Inner Plains		

The site setting is summarised in Table 2.

Table 2: Site Setting

Item	Description
Topography	The sites are predominantly flat with minor undulations. They have an elevation of approximately 25 meters above sea level.
Local Setting	The surrounding area is a mix of agricultural and lifestyle blocks with low density residential housing.
Nearest Surface Water & Use	There are two un-named land drains located along Hamptons Road and Trents Road. It is presumed that they are used for stormwater.

2.1 Geology and Hydrogeology

The documented geology and hydrogeology of the site and surrounding area is summarised in Table 3 below.

Table 3: Geological and Hydrogeological Information

Item	Description
Geology	According to GNS Science, the geology is described as Late Quaternary alluvium and colluvium; Unconsolidated to poorly consolidated mud, sand, gravel and peat of alluvial and colluvial origin.
Hydrogeology	The site is located over an unconfined / semiconfined gravel aquifer with groundwater estimated to flow in a south-easterly direction.
Groundwater Abstractions	There is one groundwater abstraction on the site: M36/4805: TJ Smith; irrigation, domestic and stock water. There are four active groundwater abstractions located within 250 m of the site. They are used for a mix of domestic supply and irrigation.
Discharge Consents	There are no discharge consents are located on the site. There is one active discharge consent within 250 m of the site which is for the discharge of domestic sewage into ground.

3 Site History

A number of sources were used to investigate the past uses of the site. The findings of these information searches have been summarised in this section.

3.1 Listed Land Use Register

Canterbury Regional Council (CRC) maintains a Listed Land Use Register (LLUR) of past and current land uses within the Canterbury Region. The LLUR documents properties on which potentially hazardous activities have been undertaken. The potentially hazardous activities are defined on the MfE HAIL. Identifying a HAIL activity on the site triggers the requirement for a contaminated land assessment prior to development under the NES.

The CRC LLUR property statement was requested by ENGEO on 8 October 2020 for the site and is presented in Appendix 2. The following table summarises the information held on the LLUR for the site.

Table 4: Summary of the CRC LLUR Register

Period From	Period To	HAIL Activity(s)	LLUR Category
None	None	No HAIL activities identified	None provided
Additional Information from LLUR Statement		No additional information provided from the LLUR statement	

3.2 Historical Aerial Photographs

Aerial photographs obtained from Canterbury Maps from 1940 to 2019 have been reviewed. The relevant visible features are summarised in Table 5.

Table 5: Historical Aerial Photograph Review

Date	Description	Image
1940-1944	The site is being used for agricultural purposes with former river channels observed. The surrounding area is being used for agricultural purposes.	

Date	Description	Image
1955-159	The south-eastern corner of the site is not available. A trotting track is visible in the central and western portion of the site. The composition of the track is unknown. The remainder of the site appears to be in use for grazing purposes. The surrounding area remains the same as the previous photograph.	
1960-1964	The site is being used for agricultural grazing, with the former trotting track no longer visible. The surrounding area remains the same as the previous photograph.	

Date	Description	Image
1965-1969	The site and surrounding area remain the same as the previous photograph.	
1970-1974	The site and the surrounding area remain the same as the previous photographs.	

Date	Description	Image
1980-184	The site and the surrounding area remain the same as the previous photographs.	
1985-1989	The site and the surrounding area remain the same as the previous photographs.	

Date	Description	Image
1990-1994	The site and the surrounding area remain the same as the previous photographs.	
1995-1999	The site and the surrounding area remain the same as the previous photographs.	

Date	Description	Image
2000-2004	A residential house is present along the central eastern boundary of the site. The remainder of the site appears to be grassed. The surrounding area remains agricultural, with some additional residential houses present.	
2010-2015	The site and the surrounding area remain the same as the previous photographs.	

3.3 Selwyn District Council Property File

The information supplied in the property file indicated that the residential house on the site was constructed in 1995-1996 and was re-clad in 2001. No other information that was relevant to the proposed plan change was provided in the property file.

3.4 Certificate of Title

A review of the certificate of title was completed with no information related to potential contaminating activities identified. The Certificates of Title are attached in Appendix 3.

4 Current Site Conditions

A site walkover was completed of all of the sites (232 and 250 Hamptons Road and 340 Trents Road) by an ENGEO representative on 12 and 14 October 2020. A summary of the walkover is provided in Table 6 below.

Table 6: Site Conditions from Walkover

Site Condition	Comments		
	232 Hamptons Road	250 Hamptons Road	340 Trents Road
Visible signs of contamination	A large waste pit was observed in the tree area along the western boundary line. Timber, plastics, furniture and appliances were observed in the waste pit (Area 1). An area of stored vehicles was observed to the northeast of the dwelling. Shipping containers and four timber sheds were also observed in this area (Area 3). An area of stored materials including cars, machinery, tyres and bricks were observed towards the middle of the site towards the eastern boundary (Area 4). Figure 2 highlights these areas of concern.	No visible signs of contamination were noted during the time of the walkover.	A burn pile was observed near the dwelling. Nails and partially burnt timber (non-greenwaste) was observed in the material (Area 7). Hummocky ground was observed to the east of the dwelling with timber posts in-situ from the former glasshouse observed (Area 6). Figure 2 highlights these areas of concern.
Surface water appearance	No surface water observed during the time of the walkover. The water race appeared to be clear and flowing with no sheens or suspended sediment observed.		

Site Condition	Comments		
	232 Hamptons Road	250 Hamptons Road	304 Trents Road
Current surrounding land use	The surrounding land use is agricultural with associated residential housing.		
Local sensitive environments	An un-named water race is present along Hamptons Road and Trents Road.		
Visible signs of plant stress	There were no visible signs of plant stress observed during the time of the walkover.		
Ground cover	The sites were predominantly grassed with gravel access roads.		
Additional Observations (if any)	A block of hazelnut trees were observed to the west of the site. Several small sheds were observed on-site in a deteriorated condition.	No additional areas of concern were noted.	Shade houses with seedlings were visible along the eastern boundary line (Trents Nursery). The boundary line had some poplar trees growing between the nursery and the investigation site (Area 5)

5 Summary of the Preliminary Site Investigation

Potential sources of contamination at the site were assessed. The information is summarised in Table 7 below.

Table 7: Potential Contaminants at the Site

Potential Source of Contamination	Contaminants of Concern	Possible Extent of Contamination	HAIL Activity as defined by the NES (soil)
Waste Pit Area 1	Heavy metals Polycyclic aromatic hydrocarbons Asbestos	Area of waste pit and surrounding soils – 232 Hamptons Road	G5: Waste disposal to land
House Fire Area 2	Heavy metals Asbestos	Area to east of dwelling where former house fire occurred	E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition 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
Vehicle storage areas Area 3 Area 4	Heavy metals TPHs	Large area of the site to north of dwelling to eastern boundary line	G4: Scrap yards including automotive dismantling, wrecking or scrap metal yards
Neighbouring shade houses Area 5	Heavy metals including mercury Organochlorine pesticides Organonitrogen Pesticides	Confined to eastern boundary line the of site only – 232 Hamptons Road	A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds
Burn pile Area 6	Heavy metals PAHs	Burn pile and surrounding soils – 232 Hamptons Road	G5: Waste disposal to land
Former glasshouse Area 7	Heavy metals including mercury Organochlorine pesticides Organonitrogen Pesticides	Former glasshouse area– 340 Trents Road	A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds

Potential Source of Contamination	Contaminants of Concern	Possible Extent of Contamination	HAIL Activity as defined by the NES (soil)
Chemical containers Area 8	Heavy metals TPH	Containers observed in former horse float, with oil stains observed.	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
Deteriorated buildings across site Areas 9	Lead Asbestos	Area around sheds and buildings to northeast of the dwelling at 232 Hamptons Road	E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition 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

Note: Heavy metals analysis includes: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc

6 Intrusive Investigation

Based on the review of the historical site uses, the COCs identified as part of this investigation were heavy metals, PAHs, asbestos, lead, TPH, OCPs and ONOPs from the waste pit, house fire, vehicle storage areas, neighbouring shade houses, burn pile, former glasshouse and from deteriorated buildings.

A total of 70 samples were taken across the site, in targeted areas of concern. Soil samples were collected from each location to assess the potential risks to human health posed by the potential historical and current contamination sources, disposal options for soils removed during the redevelopment and for the suitability of the site for the proposed residential plan change and potential future residential subdivision. The soil sample depths and analysis at each location were determined by the site's history and on-site observations.

6.1 Field Work Methodology

The following fieldwork methodology was undertaken:

- Completion of 70 samples from targeted locations, with soil samples taken from 0.0 to 0.3 m bgl. The rationale of the samples is included in Section 8.2;

- Soil samples were taken from specific areas of concern as the potential impacts would likely to have been limited to those areas. The locations would also represent areas where redevelopment workers would potentially come into contact with the material and would be representative of material to be disposed of offsite;
- All soil samples were placed in jars supplied by RJ Hill Laboratories (Hills) or Terra Scientific (Terra), dependent on analysis , which were then capped, labelled with a unique identifier and placed in chilled containers (chilly bins) prior to transportation to the laboratory. Samples were transported to Hills under standard ENGEO chain of custody documentation in Appendix 2;
- To reduce the potential for cross-contamination, each sample was collected using disposable nitrile gloves that were discarded following the collection of each sample;
- After the collection of each sample, the sampling equipment was decontaminated by washing with a solution of Decon90 and rinsing with tap water followed by deionised water;
- The intrusive samples were completed in accordance with ENGEO standard operating procedures with logging completed in general accordance with the New Zealand Geotechnical Society Inc. 'Guidelines for the Field Classification of Soil and Rock for Engineering Purposes' December 2005;
- All fieldwork and sampling was completed in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*';
- Samples were collected from the hand auger or hand trowel at each location and inspected for visual and olfactory indicators of contamination; and
- Following receipt of the samples by Hills or Terra, the soil samples were scheduled for analysis of the identified contaminants of concern – heavy metals, asbestos, OCPs, ONOPs, PAHs and TPH.

6.2 Quality Assurance and Quality Control

The quality assurance / quality control (QA / QC) procedures employed during the works included:

- Standard sample registers and chain of custody records have been kept for all samples;
- The use of the Hills and Terra who have certification through the International Accreditation New Zealand (IANZ). To maintain their accreditation, Hills and Terra undertake rigorous cross checking and routine duplicate sample testing to ensure the accuracy of their results.
- During the site investigation, every attempt was made to ensure that cross contamination did not occur through the use of procedures outlined within this document.

7 Regulatory Framework and Assessment Criteria

7.1 Selwyn District Council

In making any plan change application to rezone land for a new residential or business area, certain information is required to accompany the request. The requirements are set in Clause 22 of the First Schedule to the Act.

Clause 22 states:

- *A request made under Clause 21 shall be made to the appropriate local authority in writing and shall explain the purpose of, and reasons for, the proposed plan or change to a policy statement or plan and contain an evaluation report prepared in accordance with section 32 for the proposed plan or change.*
- *Where environmental effects are anticipated, the request shall describe those effects, taking into account clauses 6 and 7 of Schedule 4, in such detail as corresponds with the scale and significance of the actual and potential environmental effects anticipated from the implementation of the change, policy statement, or plan.*

This report will provide an assessment of the site in regards to its suitability of the site for the proposed plan change for applicable information only.

7.2 NES

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on 1 January 2012 (MfE, 2011).

The NES introduced soil contaminant standards (SCSs) for 12 priority contaminants for the protection of human health under a variety of land use scenarios.

The NES requires the *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values* be used where a NES SCS is not available. The NES does not consider environmental receptors; accordingly, the application of guidelines relevant to environmental receptors shall be implemented according to the MfE CLMG No.2 and relevant rules in the regional plan.

7.3 Disposal Criteria

An assessment of potential off-site disposal options for excess soil generated during site development works has been conducted. Dependent on the contamination conditions of the spoil, off-site disposal options range from disposal to “cleanfill” sites to managed waste sites. As outlined in the publication Waste Management Institute of New Zealand Technical Guidelines for Disposal to Land (August 2018) the definition of cleanfill states:

“Virgin excavated natural materials (VENM) such as clay, soil and rock that are free of:

- Combustible, putrescible, degradable or leachable components;
- Hazardous substances or material (such as municipal solid waste) likely to create leachate by means of biological breakdown;

- Products or materials derived from hazardous waste treatment, stabilisation or disposal practices;
- Materials such as medical and veterinary waste, asbestos or radioactive substances that may present a risk to human health if excavated;
- Contaminated soil and other contaminated materials; and
- Liquid waste."

7.4 Assessment Criteria

Contaminant concentrations in soil were compared to human health criteria based on two land uses:

- Residential land use criteria (used for future land use); and
- Commercial / Industrial land use (based on an outdoor worker scenario) (for redevelopment workers).

The land use scenarios are relevant to the likely future use of the site and are being used as a surrogate to assess short term risks to redevelopment earthworkers on-site during the development activities.

The NES methodology document notes that the exposure parameters assumed for the maintenance / excavation scenario in other New Zealand guidelines are unrealistic (perhaps by a factor of ten or more). The technical committee preparing the NES decided that a maintenance / excavation worker scenario should not be included in the NES as sites would not be cleaned up to this standard; it was considered more appropriate that exposures to these workers be limited through the use of site-specific controls that are required under health and safety legislation. However, this report uses commercial / industrial outdoor worker criteria to get a general sense of potential risks to excavation workers during the redevelopment. Note that commercial / industrial outdoor worker criteria are based on personnel carrying out maintenance activities involving soil exposure to surface soil during landscaping activities, and occasional shallow excavation for routine underground service maintenance. Exposure to soil is less intensive than would occur during construction works but occurs over a longer period.

For a construction worker developing the site, the soil exposure is limited when compared to a large earthworks project (e.g. for a residential subdivision or industrial development). As such, the commercial / industrial outdoor worker criteria are considered suitable for obtaining a high-level understanding of potential risks to excavation workers during site redevelopment and confirming the need for site controls.

8 Results

8.1 Field Observations

A summary of the field observations is presented in Table 8 below.

Table 8: Typical Subsurface Geology

Geological Unit	Typical Depth (m bgl)	Material Description
TOPSOIL	0.0-0.3	Silty fine to medium SAND with trace rootlets, brown
ALLUVUIM	0.3-0.5	Silty fine to medium SAND with trace rootlets and gravel; light brown.

Groundwater was not encountered in any of the sample locations. No visual or olfactory indicators of contamination were observed in the samples taken aside from potentially asbestos containing material (PACM) observed around the shed areas of Area 9.

During the site sampling visit, the current homeowner stressed that they did not want ENGEO to sample the observed waste pit (Area 1) due to the potential presence of personal items.

8.2 Sample Rationale

The sample rationale is listed in Table 9 below.

Table 9: Sample Rationale

Location on-site	Sample Number	HAIL Activity	Analysis
Area 2	A251, A252, A253	E1 & I	Heavy metals Asbestos
Area 3	A351, A3510, A3511, A352, A353, A354, A355, A356, A357, A358, A359	G4	Heavy metals TPH
Area 4	A451, A452, A453, A454	G4	Heavy metals TPH
Area 5	A551, A552, A553, A554, A555, A556	A10	Heavy metals OCPs ONOPs
Area 6	A651, A652, A653, A654, A655	G5	Heavy metals PAHs
Area 7	A751, A752, A753, A754, A755	A10	Heavy metals OCPs ONOPs
Area 8	A851	I	Heavy metals TPH

Location on-site	Sample Number	HAIL Activity	Analysis
Area 9	A9_1.1, A9_1.2, A9_2.1, A9_2.2, A9_3.1, A9_3.2, A9_4.1, A9_4.2, A9_5.1, A9_5.2, A9_6.1, A9_6.2, A9_7.1, A9_7.2, A9_8.1, A9_9.1, A9_9.2, A9_10.1, A9_10.2	E1 & I	Heavy metals Asbestos

Discussion of the Results

Soil analytical results and the adopted soil assessment criteria are presented in Tables 10 to 20. Certified laboratory analysis reports are included in Appendix 2.

The analytical results can be summarised as follows:

Area 2

No exceedances of the guideline criteria for Residential land use were observed. The results were above the Regional Background levels for arsenic, cadmium, chromium, copper, lead and zinc. No asbestos was identified in the soil samples taken.

Area 3

No exceedances of the guideline criteria for Residential land use were observed. The results were above the Regional Background levels for cadmium, copper, lead and zinc.

Area 4

No exceedances of the guideline criteria for Residential land use were observed. The results were above the Regional Background levels for cadmium and zinc.

Area 5

No exceedances of the guideline criteria for Residential land use or regional background levels were observed.

Area 6

No exceedances of the guideline criteria for Residential land use were observed. The results were above the Regional Background levels for cadmium, lead and zinc.

Area 7

Lead was observed in the soil samples analysed above the Residential land use criteria. The results were above the Regional Background levels for cadmium, lead and zinc.

Area 8

Lead was observed in the soil samples analysed above the Residential land use criteria. TPH C7-C36 was above the All Pathways guideline criteria. The Regional Background levels were exceeded for cadmium, chromium, copper, lead and zinc.

Area 9

Lead was observed in the soil samples analysed above the Residential land use criteria. The Regional Background levels were exceeded for lead, cadmium, chromium and zinc. No asbestos was identified in the soil samples taken. A positive identification of asbestos was identified in one of the building material samples.

Table 10: Area 2 Analysis Results

Analyte	Units	A251	A252	A253	Additional Criteria	Assessment Criteria	
Lab Sample ID		2453715_1	2453715_2	2453715_3	Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Soil Depth		surface	surface	surface			
Sample Date		12-10-2020	12-10-2020	12-10-2020			
Heavy Metals							
Arsenic	mg/kg	10	**15**	**13**	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	**0.55**	**1.48**	**0.51**	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	**23**	**37**	**29**	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	**31**	**79**	**32**	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	**165**	**86**	**108**	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	12	**23**	15	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	**540**	**1060**	**500**	**96.94**	400000 (B)	7400 (B)

General Notes:
Cells highlighted red exceed one or more assessment criteria,.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Table 11: Area 2 Asbestos Analysis Results

Sample Name	Sample Type	Result
A1 S1 @ 0.0-0.2	Soil	No asbestos detected
A1 S2 @ 0.0-0.2	Soil	No asbestos detected
A1 S3 @ 0.0-0.2	Soil	No asbestos detected

Table 12: Area 3 Heavy Metal Analysis Results

Analyte	Units	A351	A3510	A3511	A352	A353	A354	A355	A356	A357	A358	A359	Additional Criteria	Assessment Criteria	
Lab Sample ID		2453715_4	2453715_13	2453715_14	2453715_5	2453715_6	2453715_7	2453715_8	2453715_9	2453715_10	2453715_11	2453715_12	Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Soil Depth		surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface			
Sample Date		12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020			
Heavy Metals															
Arsenic	mg/kg	5	5	6	5	6	6	6	5	6	10	5	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	0.15	**0.68**	**0.56**	**0.2**	**0.39**	**0.29**	**0.26**	0.19	**0.2**	0.18	**0.24**	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	15	16	17	17	16	18	16	17	16	17	16	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	9	14	10	**220**	9	10	**60**	10	11	10	9	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	24	**69**	35	**42**	28	**54**	**51**	30	**80**	37	24	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	12	16	13	14	12	13	15	12	12	13	12	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	86	**156**	88	**104**	84	87	**118**	87	**156**	**101**	81	**96.94**	400000 (B)	7400 (B)

General Notes:
Cells highlighted red exceed one or more assessment criteria,
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Table 13: Area 3 TPH Analysis Results

Analyte	Units	A351	A3510	A3511	A352	A353	A354	A355	A356	A357	A358	A359	Assessment Criteria All Pathways Sand
Lab Sample ID		**2453715_4**	**2453715_13**	**2453715_14**	**2453715_5**	**2453715_6**	**2453715_7**	**2453715_8**	**2453715_9**	**2453715_10**	**2453715_11**	**2453715_12**	
Soil Depth		**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	**surface**	
Sample Date		**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	< 1m (A)
Sample Soil Type													
Guideline Soil Depth		**< 1m**	**< 1m**	**< 1m**	**< 1m**	**< 1m**	**< 1m**	**< 1m**	**< 1m**	**< 1m**	**< 1m**	**< 1m**	
Total Petroleum Hydrocarbons													
C7 - C9	mg/kg	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	120
C10 - C14	mg/kg	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	400
C15 - C36	mg/kg	56	< 40	< 40	44	< 40	51	65	< 40	< 40	< 40	68	20000

General Notes:
Cells highlighted red exceed one or more assessment criteria.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Guideline Notes:
A - Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 1999), B - Environmental Protection Agency – Regional Screening Levels (May 2020)

Table 14: Area 4 Heavy Metals Analysis Results

Analyte	Units	A451	A452	A453	A454	Additional Criteria	Assessment Criteria	
Lab Sample ID		2453715_15	2453715_16	2453715_17	2453715_18	Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Soil Depth		surface	surface	surface	surface			
Sample Date		12-10-2020	12-10-2020	12-10-2020	12-10-2020			
Heavy Metals								
Arsenic	mg/kg	5	8	5	4	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	0.14	**0.2**	**0.22**	0.16	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	13	15	14	13	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	7	11	6	8	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	28	31	26	23	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	9	10	9	8	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	70	**136**	74	80	**96.94**	400000 (B)	7400 (B)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
This table does not represent the full analytical results, please refer to the laboratory results for full details.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Table 15: Area 4 TPH Analysis Results

Analyte	Units	A451	A452	A453	A454	Assessment Criteria All Pathways Sand
Lab Sample ID		**2453715_15**	**2453715_16**	**2453715_17**	**2453715_18**	
Soil Depth		**surface**	**surface**	**surface**	**surface**	
Sample Date		**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	< 1m (A)
Sample Soil Type						
Guideline Soil Depth		**< 1m**	**< 1m**	**< 1m**	**< 1m**	
Total Petroleum Hydrocarbons						
C7 - C9	mg/kg	< 8	< 8	< 8	< 8	120
C10 - C14	mg/kg	< 20	< 20	< 20	< 20	400
C15 - C36	mg/kg	< 40	175	57	138	20000

General Notes:
Cells highlighted red exceed one or more assessment criteria.
This table does not represent the full analytical results, please refer to the laboratory results for full details.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.

Guideline Notes:
A - Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 1999), B - Environmental Protection Agency – Regional Screening Levels (May 2020)

Table 16: Area 5 Analysis Results

Analyte	Units	A551	A552	A553	A554	A555	A556	Additional Criteria	Assessment Criteria	
								Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Lab Sample ID		2453715_19	2453715_20	2453715_21	2453715_22	2453715_23	2453715_24			
Soil Depth		surface	surface	surface	surface	surface	surface			
Sample Date		12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020			
Heavy Metals										
Arsenic	mg/kg	5	4	4	3	4	4	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	< 0.1	0.13	< 0.1	0.12	0.14	0.12	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	15	14	13	13	13	13	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	7	6	7	7	7	7	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	20	19.8	19.6	17.5	18.7	18.7	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	9	10	10	9	7	7	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	66	68	74	68	69	69	**96.94**	400000 (B)	7400 (B)
Mercury	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**0.11**	4200 (A)	310 (A)
Organochlorine Pesticides										
Aldrin	mg/kg	< 0.011	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	-	160 (A)	2.6 (A)
4,4'-DDD	mg/kg	< 0.011	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	-	9.6 (C)	1.9 (C)
4,4'-DDE	mg/kg	< 0.011	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	-	9.3 (C)	2 (C)
4,4'-DDT	mg/kg	< 0.011	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	-	8.5 (C)	1.9 (C)
Total DDT Isomers	mg/kg	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	-	1000 (A)	70 (A)
Dieldrin	mg/kg	< 0.011	< 0.012	< 0.011	< 0.011	< 0.011	< 0.011	-	160 (A)	2.6 (A)
Aldrin + dieldrin	mg/kg	< 0.022	< 0.024	< 0.022	< 0.022	< 0.022	< 0.022	-	160 (A)	2.6 (A)

General Notes:
Cells highlighted red exceed one or more assessment criteria
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013), C - Regional Screening Levels Targeted Hazard Quotient 1.0 (US EPA, 2020), D - Identifying, Investigating and Managing Risks Associated with Former Sheep-dip Sites (MfE, 2006)

Table 17: Area 6 Analysis Results

Analyte	Units	A651	A652	A653	A654	A655	Additional Criteria	Assessment Criteria	
Lab Sample ID		**2453715_25**	**2453715_26**	**2453715_27**	**2453715_28**	**2453715_29**	Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Soil Depth		**surface**	**surface**	**surface**	**surface**	**surface**			
Sample Date		**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**	**12-10-2020**			
Heavy Metals									
Arsenic	mg/kg	5	5	5	6	4	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	0.14	0.14	0.16	**0.25**	< 0.1	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	14	15	15	14	14	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	16	11	12	13	8	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	**60**	**56**	**63**	**94**	31	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	10	10	10	10	10	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	**220**	**151**	**162**	**290**	92	**96.94**	400000 (B)	7400 (B)
Polycyclic Aromatic Hydrocarbons									
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	mg/kg	0.03	-	-	-	-	**-**	35 (A)	10 (A)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013),

Table 18: Area 7 Analysis Results

Analyte	Units	A751	A752	A753	A754	A755	Additional Criteria	Assessment Criteria	
							Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Lab Sample ID		2453715_30	2453715_31	2453715_32	2453715_33	2453715_34			
Soil Depth		surface	surface	surface	surface	surface			
Sample Date		12-10-2020	12-10-2020	12-10-2020	12-10-2020	12-10-2020			
Heavy Metals									
Arsenic	mg/kg	5	4	3	3	5	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	**0.36**	**0.4**	< 0.1	< 0.1	< 0.1	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	13	14	13	13	14	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	18	12	7	8	7	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	**360**	**340**	24	32	17.8	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	10	11	9	10	11	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	**370**	**420**	71	84	86	**96.94**	400000 (B)	7400 (B)
Mercury	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	**0.11**	4200 (A)	310 (A)
Organochlorine Pesticides									
Aldrin	mg/kg	< 0.014	< 0.013	< 0.013	< 0.013	< 0.012	-	160 (A)	2.6 (A)
4,4'-DDD	mg/kg	< 0.014	< 0.013	< 0.013	< 0.013	< 0.012	-	9.6 (C)	1.9 (C)
4,4'-DDE	mg/kg	< 0.014	< 0.013	< 0.013	< 0.013	< 0.012	-	9.3 (C)	2 (C)
4,4'-DDT	mg/kg	< 0.014	< 0.013	< 0.013	< 0.013	< 0.012	-	8.5 (C)	1.9 (C)
Total DDT Isomers	mg/kg	< 0.08	< 0.08	< 0.08	< 0.08	< 0.07	-	1000 (A)	70 (A)
Dieldrin	mg/kg	< 0.014	< 0.013	< 0.013	< 0.013	< 0.012	-	160 (A)	2.6 (A)
Aldrin + dieldrin	mg/kg	< 0.028	< 0.026	< 0.026	< 0.026	< 0.024	-	160 (A)	2.6 (A)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013), C - Regional Screening Levels Targeted Hazard Quotient 1.0 (US EPA, 2020),

Table 19: Area 8 Heavy Metal Analysis Results

Analyte	Units	A851	Additional Criteria	Assessment Criteria	
			Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Lab Sample ID		**2453715_35**			
Soil Depth		**surface**			
Sample Date		**12-10-2020**			
Heavy Metals					
Arsenic	mg/kg	7	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	**2.2**	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	**63**	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	**34**	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	**1260**	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	12	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	**760**	**96.94**	400000 (B)	7400 (B)
Mercury	mg/kg	-	**0.11**	4200 (A)	310 (A)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013),

Table 20: Area 8 TPH Analysis Results

Analyte	Units	A851	Assessment Criteria
			All Pathways
			Sand
Lab Sample ID		**2453715_35**	
Soil Depth		**surface**	
Sample Date		**12-10-2020**	< 1m (A)
Sample Soil Type			
Guideline Soil Depth		**< 1m**	
Polycyclic Aromatic Hydrocarbons			
C7 - C9	mg/kg	154	120
C10 - C14	mg/kg	950	400
C15 - C36	mg/kg	109,000	20000

General Notes:
Cells highlighted red exceed one or more assessment criteria.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.

Guideline Notes:
A - Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 1999),

Table 21: Area 9 Analysis Results

Analyte	Units	A9_1.1	A9_1.2	A9_2.1	A9_2.2	A9_3.1	A9_3.2	A9_4.1	A9_4.2	A9_5.1	A9_5.2	A9_6.1	A9_6.2	A9_7.1	A9_7.2	A9_8.1	A9_9.1	A9_9.2	A9_10.1	A9_10.2	Additional Criteria	Assessment Criteria	
																					Background (bl) - Canterbury Regional	Industrial	Residential - 10% produce
Lab Sample ID		2455602_1	2455602_2	2455602_3	2455602_4	2455602_5	2455602_6	2455602_7	2455602_8	2455602_9	2455602_10	2455602_11	2455602_12	2455602_13	2455602_14	2455602_15	2455602_16	2455602_17	2455602_18	2455602_19			
Soil Depth		surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface			
Sample Date		14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020	14-10-2020			
Heavy Metals																							
Arsenic	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	**12.58**	70 (A)	20 (A)
Cadmium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.37**	-	-	-	-	**0.19**	1300 (A)	3 (A)
Chromium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**24**	-	-	-	-	**22.7**	6300 (A)	460 (A)
Copper	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	-	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	17.7	18.9	**3400**	**198**	31	24	32	24	**160**	**240**	**1910**	**45**	**350**	**68**	**260**	**940**	**520**	**148**	**49**	**40.96**	3300 (A)	210 (A)
Nickel	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	**20.7**	6000 (B)	400 (B)
Zinc	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**640**	-	-	-	-	**96.94**	400000 (B)	7400 (B)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013),

Table 22: Area 9 Asbestos Results

Sample Name	Sample Type	Result
A9 – 1.1	Soil	No asbestos detected
A9 – 1.2	Soil	No asbestos detected
A9_1	Bulk	Chrysotile (white asbestos)
A9_2	Bulk	No asbestos detected

9 Conceptual Site Model

A conceptual site model consists of four primary components. For contaminants to present a risk to human health or an environmental receptor, all four components are required to be present and connected. The four components of a conceptual site model are:

- Source of contamination;
- Pathway(s) in which contamination could potentially mobilise along (e.g. vapour or groundwater migration);
- Sensitive receptor(s) which may be exposed to the contaminants; and
- An exposure route, where the sensitive receptors and contaminants come into contact (e.g. ingestion, inhalation, dermal contact).

The potential source, pathway and receptor linkages at this subject site are provided in Table 23.

Table 23: Conceptual Site Model

Potential Sources	Potential Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk?
Waste pit Area 1	Heavy metals and PAHs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**Unknown,** soil samples required to assess risk to human health and risk to ecological receptors.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	

Potential Sources	Potential Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk?
Burn pile Area 6	Heavy metals PAHs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**Yes**. No exceedances of the residential guideline criteria observed in the samples taken.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	
Former glasshouse Area 7	Heavy metals including mercury OCPs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**No**, lead present above residential guideline criteria in soil samples taken.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	
Neighbouring shade houses Area 5	Heavy metals including mercury OCPs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**Yes**. No exceedances of the residential guideline criteria observed in the samples taken.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	

Potential Sources	Potential Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk?
Vehicle storage areas Areas 3 and 4	Heavy metals TPHs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**Yes**. No exceedances of the residential guideline criteria observed in the samples taken.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	
House fire Area 2	Asbestos Heavy metals	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**Yes**. No exceedances of the residential guideline criteria observed in the samples taken.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	

Potential Sources	Potential Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk?
Deteriorated buildings across site Area 9	Asbestos Lead	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**No**, lead present above residential guideline criteria in soil samples taken, and asbestos identified in building material fragment.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	

10 Conclusions

The information collected indicates that the site has been used for mixed purposes which includes residential land use, market gardening operations, a farm, and for storing vehicles, with these operations having the potential to impact the underlying soils. ENGEO understands that the site is to undergo a plan change assessment, with the potential for future residential subdivision. An assessment of the site for its suitability for the proposed plan change is required under the Selwyn District Council requirements. During the potential residential subdivision, soil disturbance and removal is likely to occur. ENGEO was engaged by Urban Estates Limited to complete soil testing to assess the concentrations of contaminants of concern at the site, and to provide advice regarding the suitability of the site for the proposed plan change, potential residential subdivision, the health and safety of future redevelopment workers, disposal options, and whether resource consents would be required for the future redevelopment works.

From the desktop review, the majority of the site appears to have been used for agricultural purposes, with the likelihood of the majority of the site being impacted from this land use to be low. A number of potential areas of concern were highlighted in the desktop review, and these were further investigated during the site walkover.

During the site walkover, a number of HAIL activities were observed and were located across the wider site area. The HAIL activities are associated with the former and current uses of the site as a farm and residential site, and are considered to have the potential to have impacted the underlying soils. The HAIL categories included the following:

- A10: Persistent pesticide bulk storage or use including sports turfs, market gardens, orchards, glass houses or spray sheds;
- E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition;

- G4: Scrap yards including automotive dismantling, wrecking or scrap metal yards;
- G5: Waste disposal to land (excluding where biosolids have been used as soil conditioners); and
- 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.

A targeted intrusive investigation was undertaken to assess if the soil had been impacted by the former and current uses of the site identified during the walkover and desktop review. The investigation comprised the collection of a total of 70 soil samples from the nine areas of concern at the site (see Figures 4 to 6 for reference).

The soil samples were submitted to either RJ Hill Laboratories or Terra Scientific, dependent on analysis type, to be analysed for the presence of the identified contaminants of concern. The results from the laboratory analysis indicate the following:

Area 1: Waste Pit

During the time of the soil sampling, the current site owner requested that this area was not sampled due to the presence of personal items. Therefore, this area remains un-investigated and will require further work at a later date to identify the potential risk to the future land users.

Area 2: Former House Fire

Due to a house fire occurring at the residential building at 232 Hamptons Road soil samples were collected from around the current building for heavy metals and asbestos. No elevated concentrations were identified in the soil samples analysed. Heavy metals were identified above the regional background levels.

Area 3: Vehicle Storage

A number of vehicles were observed around the farm buildings at 232 Hamptons Road. Soil samples taken from around the vehicles returned concentrations below the residential guideline criteria. Heavy metals were observed above regional background levels.

Area 4: Vehicle Storage

A number of vehicles were also observed to the north of the farm buildings. Soil samples taken from around the vehicles returned concentrations below the residential guideline criteria. Heavy metals were observed above regional background levels.

Area 5: Neighbouring Shade houses

Soil samples were collected along the eastern boundary of the site adjacent to the shade houses on 382 Trents Road. No concentrations of the contaminants of concern were identified in the soil samples analysed. No exceedances of the regional background levels were observed.

Area 6: Burn Pile

A burn pile observed during the time of the walkover returned analysis results below the residential guideline criteria for the site. Heavy metals were observed above the regional background levels.

Area 7: Former Glasshouse

In the location of the former glasshouse at 340 Trents Road, lead concentrations were identified above residential guideline levels. Heavy metals were also observed above the regional background levels.

Area 8: Chemical Containers

A horse float was observed amongst the farm buildings at 232 Hamptons Road which contained numerous chemical containers of which a number had spilt and impacted the surrounding land. Lead was identified above residential land use criteria along with TPH. Heavy metals were also observed above the regional background levels.

Area 9: Deteriorated Buildings

A number of farm buildings at 232 Hamptons Road were observed to be in a deteriorated condition. Soil samples were taken from soil surrounding the buildings with the soil analysis results returning concentrations of lead above residential guideline criteria. Asbestos containing material was also identified in one sample.

Disposal Options

As the soil analysis results were above the regional background levels for the site, soils from the areas investigated is unlikely to be able to be disposed of at a cleanfill facility.

Suitability of the Site for Future Residential Subdivision

Based on the results taken from the former glasshouse area, and in and around the farm buildings at 232 Hamptons Road, if future residential land users come into contact with the soil, a complete contaminant exposure pathway is likely to be present and an unacceptable risk to human health would exist. Therefore, in the site's current state, future residential subdivision is likely to be considered a restricted discretionary activity under Regulation 10 of the NES for Assessing and Managing Contaminants in Soil to Protect Human Health.

There are several options available to mitigate the risks to human health and enable the site to be subdivided and used for residential land use. The options available are:

- Excavation and removal from the site of contamination above the human health SCS for the proposed residential land use. This would likely require consent for the disturbance of the 'contaminated site' during remediation. Disposal to off-site landfills should be investigated to confirm the costs associated with this option.
- The placement of a barrier over the existing impacted areas to adequately impact exposure. This could include stabilising, capping and containing the soils exceeding the relevant SCS. If this option is chosen, it is likely that Selwyn District Council would require a long term management plan and discharge consent, and the soils should be placed in areas underneath hardstanding or an appropriate amount of soil.
- Creating an encapsulation cell in an area of the site. Again this option will likely require a number of consents including land disturbance, deposition of contaminated soils to land, and a long term management plan and discharge consent. Additional testing of the contaminated material would also likely be required for the potential leaching of the material.

In addition to the areas already investigated, it should be noted that the waste pit located at 232 Hamptons Road is yet to be investigated. It is understood that this area will be investigated once the site has changed ownership.

11 Recommendations

ENGEO recommend that a remedial strategy is developed to manage the soil that exceeds the NES for residential land use in the areas of the site identified in this report. The remedial strategy should be formulated in conjunction with the final development plans, including soil removal volumes and locations, and with the District and Regional Councils, so that the most appropriate, cost effective and sustainable approach can be implemented.

Additional investigations into the previously untested areas of the site, such as the waste pit, can be completed alongside supplementary investigations to delineate and confirm the remedial scope.

Due to the concentrations of the contaminants of concern at the site, a resource consent for land disturbance and removal is likely to be required during the site works. If a volume of soil exceeding 25 m^3 per 500 m^2 of development area is proposed to be disturbed, or if a volume of soil exceeding 5 m^3 per 500 m^3 of development area per year is proposed to be disposed of off-site, a consent should be obtained according to the requirements of the NES. Whether the work is to be undertaken under a consent or not, a site management plan is required to manage the risks to the on-site workers and the surrounding population and environment. An additional stormwater discharge consent may be required from Canterbury Regional Council for the duration of the redevelopment works on-site.

Information obtained during the investigation indicated that asbestos may be present within the buildings constructed on-site, and an asbestos survey should be carried out on the buildings to assess their condition before any demolition occurs. This will help Urban Estates to meet its obligations under the Health and Safety at Work (Asbestos) 2016 Regulations.

The conclusions and recommendations of this report are limited to the areas / depths of soil sampled. Therefore, there is the potential for unidentified hot spots of contamination to exist at the site. As previously sated, a site management plan (SMP) should outline procedures to identify and mitigate exposure to identified and unidentified contamination, if encountered during the redevelopment works.

11.1 Assessment of Environmental Effects

Based on the requirement of Section 88 of the Resource Management Act (RMA) and the framework set out in the Fourth Schedule of the RMA, the actual and potential effects associated with the proposed works are summarised in Table 24.

The environmental effects of the proposed plan change from rural residential / agricultural to residential are expected to have a no more than minor effect on the environment. Whilst elevated concentrations of concern are currently present on-site, following remediation, it is considered that the remaining site would have a less than minor impact on the receiving environment. Overall, it is considered that additional investigations and management controls may be required to address any land contamination, but that these are able to be managed through the requirements of the NESCS prior to any redevelopment works occurring and do not preclude the rezoning of the site as proposed.

Table 24: AEE from Redevelopment Works

Schedule Four Item	Assessment of Environmental Effects
Description of the proposal	The site area consisting of 232 and 250 Hamptons Road and 340 Trents Road is currently zoned as Inner Plains with the proposal designed to increase the residential density of the site.
Where the activity is likely to result in significant adverse effects, a description of the alternatives	Any actual or potential effects on the environment are likely to be less than minor. The elevated contaminants of concern at the site are not considered to be significant in relation to development works that are anticipated through the rezoning, and can be appropriately managed during redevelopment.
An assessment of the actual potential effects on the environment	Earthworks would be conducted in line with consent conditions in addition to the proposed mitigation measures detailed in the RAP. Potential for removal works to generate minor amounts of dust during the excavation and removal of impacted soil. Mitigation will involve utilising water to suppress dust and covering soil stockpiled on-site as well as all truckloads leaving the site. Potential for stormwater run-off to be contaminated if it encounters the impacted soil. Potential for noise generation from excavators. Contribution of site generated noise is unlikely to be significant and will be completed within typical working hours.
Where the activity includes the discharge of any contaminants, a description of: - Nature of the discharge - Sensitivity of the receiving environment - Alternative methods of discharge	No planned discharges. The site redevelopment will involve the removal of the identified contaminants of concern. Groundwater is not considered sensitive and therefore leaching to groundwater is likely to have a no more than minor impact.
Any effects on ecosystems, including plants or animals, physical disturbance of habitats in the vicinity	In accordance with the MfE (1999) Guidelines a Tier 1 ecological risk assessment has been conducted. No significant ecological receptors have been identified within close proximity of the site.
Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual or cultural, or other special values for present or future generation	No effects anticipated.

Schedule Four Item	Assessment of Environmental Effects
Description of the mitigation measures (safeguards and contingency plans) where relevant to be undertaken to help prevent or reduce actual or potential effect	A site management plan or remedial action plan is proposed to be issued and implemented during the redevelopment.
Where the scale or significance of the activity's effect are such that monitoring is required, a description of how, once the proposal is approved, effects will be monitored and by whom	Monitoring of site conditions and soil volumes is proposed.

12 References

ECan (2007a). *Background Concentrations of Selected Trace Elements in Canterbury Soils. Addendum 1: Additional Samples and Timaru Specific Background Levels.* Report prepared for Environment Canterbury by Tonkin & Taylor Limited, Christchurch, New Zealand. Report Number R07/1/2. Tonkin & Taylor Reference: 50875.003.

MfE (2002). *A Guide to the Management of Cleanfills*.

MfE (2011a). *Ministry for the Environment Hazardous Activities and Industries List.*

MfE (2011b). *Contaminated Land Management Guidelines No.1: Reporting on Contaminated Sites*.

MfE (2011c). *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values.*

MfE (2011d). *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*.

MfE (2011f). *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.*

MfE (2012). *Users' guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.*

WAMINZ. (2016). *Waste Management Institute New Zealand.* Technical Guidelines for Disposal to Land.

13 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Urban Estates Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by

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Senior Engineering / Environmental Geologist

Report reviewed by

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Principal Environmental Consultant

FIGURES

DATE PLOTTED: 19 October 2020 2:10:00 pm BY: NFlatman

Legend

Boundary line

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

0 50 100
Metres

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

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Title: Site Location Plan

Client: Urban Estates		Figure No: 1
Project: 232 and 250 Hamtpons Road and 340 Trents Road	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:4,000	Revision: A

PATH: Z:\Projects\17901 to 18000\17903.000.001 - Prebbleton Mega Site\06_CAD-GIS_Figures\Environ\Rhodes\Fig01.mxd

ORIGINAL FIGURE PRINTED IN COLOUR

DATE PLOTTED: 19 October 2020 3:31:15 pm BY: NFlatman

Legend

- Areas of concern
- Boundary line

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

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Title:
Areas of Concern

Client: Urban Estates		Figure No: 2
Project: 232 and 250 Hamtpons Road and 340 Trents Road	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:2,500	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

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DATE PLOTTED: 19 October 2020 3:35:36 pm BY: NFlatman

Legend

- Lead areas of concern
- Boundary line

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title: Areas of Concern - Lead

Client: Urban Estates		Figure No: 3
Project: 232 and 250 Hamtpons Road and 340 Trents Road	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:663	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

PATH: Z:\Projects\17901 to 18000\17903.000.001 - Prebbleton Mega Site\06_CAD-GIS_Figures\Enviro\Rhodes\Fig01.mxd

DATE PLOTTED: 22 October 2020 2:37:14 pm BY: NFlatman

PATH: Z:\Projects\17901 to 18000\17903.000.001 - Prebbleton Mega Site\06_CAD-GIS_Figures\Enviro\Rhodes\Fig01.mxd

1559200

5174200

Legend

Sample locations

Boundary line

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title: Site Location Plan

Client: Urban Estates		Figure No: 4
Project: 232 and 250 Hamtpons Road and 340 Trents Road	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:500	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

DATE PLOTTED: 19 October 2020 3:20:11 pm BY: NFlatman

PATH: Z:\Projects\17901 to 18000\17903.000.001 - Prebbleton Mega Site\06_CAD-GIS_Figures\EnviroRhodes\Fig01.mxd

1559400

5174200

A5S6

A5S5

A5S4

A5S3

A5S2

A5S1

A4S3

A4S4

A9_9.2

A9_10.01

A9_10.2

A4S1

A4S2

N

50

100

Metres

Map Extent

Prebb

Legend

Sample locations

Boundary line

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title: Sample Location Plan

Client: Urban Estates		Figure No: 5
Project: 232 and 250 Hamtpons Road and 340 Trents Road	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:600	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

DATE PLOTTED: 19 October 2020 3:21:11 pm BY: NFlatman

1559200

5174600

A7S4
A7S5
A7S3
A7S1
A7S2

A6S2
A6S5
A6S1
A6S3
A6S4

0 50 100
Metres

Legend

Sample locations

Boundary line

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title:
Sample Location Plan

Client: Urban Estates		Figure No: 6
Project: 232 and 250 Hamtpons Road and 340 Trents Road	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:663	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

PATH: Z:\Projects\17901 to 18000\17903.000.001 - Prebbleton Mega Site\06_CAD-GIS_Figures\Enviro\Rhodes\Fig01.mxd

APPENDIX 1:

Site Photographs – 250 Hamptons Road

Photo 1: Dwelling at 250 Rhodes Road

Photo 2: Paddock looking from dwelling looking north

Photo 3: Evidence of green waste burn pile along northern boundary

Photo 4: Evidence of old green waste burn pile

Photo 5: Loading pen in south-western corner

Photo 6: Site looking south from north-western corner

ENGEO
Expect Excellence

Date taken	Oct 2020	**Client**	**Urban Estates**		
Taken by	NF	**Project**	**250 Hamptons Road**		
Approved by	DR	**Description**	**Site Photographs**		
Photo No.	1 to 6	**ENGEO Ref.**	17903	**Appendix Ref.**	1a

APPENDIX 2:

CRC LLUR 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:	08 October 2020	
Land Parcels:	Lot 2 DP 29158	Valuation No(s): 2355200300

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:

There are no sites associated with the area of enquiry.

Information held about the sites on the Listed Land Use Register

There are no sites associated with the area of enquiry.

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 ENQ265246.

Disclaimer:

The enclosed information is derived from Environment Canterbury's Listed Land Use Register and is made available to you under the Local Government Official Information and Meetings Act 1987 and Environment Canterbury's Contaminated Land Information Management Strategy (ECan 2009).

The information contained in this report reflects the current records held by Environment Canterbury regarding the activities undertaken on the site, its possible contamination and based on that information, the categorisation of the site. Environment Canterbury has not verified the accuracy or completeness of this information. It is released only as a copy of Environment Canterbury's records and is not intended to provide a full, complete or totally accurate assessment of the site. It is provided on the basis that Environment Canterbury makes no warranty or representation regarding the reliability, accuracy or completeness of the information provided or the level of contamination (if any) at the relevant site or that the site is suitable or otherwise for any particular purpose. Environment Canterbury accepts no responsibility for any loss, cost, damage or expense any person may incur as a result of the use, reference to or reliance on the information contained in this report.

Any person receiving and using this information is bound by the provisions of the Privacy Act 1993.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Listed Land Use Register

What you need to know

Everything is connected

What is the Listed Land Use Register (LLUR)?

The LLUR is a database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

Why do we need the LLUR?

Some activities and industries are hazardous and can potentially contaminate land or water. We need the LLUR to help us manage information about land which could pose a risk to your health and the environment because of its current or former land use.

Section 30 of the Resource Management Act (RMA, 1991) requires Environment Canterbury to investigate, identify and monitor contaminated land. To do this we follow national guidelines and use the LLUR to help us manage the information.

The information we collect also helps your local district or city council to fulfil its functions under the RMA. One of these is implementing the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil, which came into effect on 1 January 2012.

For information on the NES, contact your city or district council.

How does Environment Canterbury identify sites to be included on the LLUR?

We identify sites to be included on the LLUR based on a list of land uses produced by the Ministry for the Environment (MfE). This is called the Hazardous Activities and Industries List (HAIL)[1]. The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

We have two main ways of identifying HAIL sites:

- We are actively identifying sites in each district using historic records and aerial photographs. This project started in 2008 and is ongoing.
- We also receive information from other sources, such as environmental site investigation reports submitted to us as a requirement of the Regional Plan, and in resource consent applications.

[1] The Hazardous Activities and Industries List (HAIL) can be downloaded from MfE's website www.mfe.govt.nz, keyword search HAIL

How does Environment Canterbury classify sites on the LLUR?

Where we have identified a HAIL land use, we review all the available information, which may include investigation reports if we have them. We then assign the site a category on the LLUR. The category is intended to best describe what we know about the land use and potential contamination at the site and is signed off by a senior staff member.

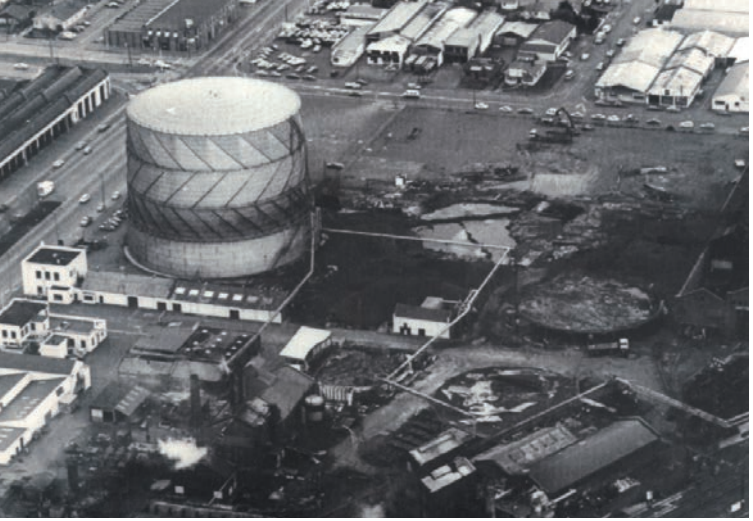
Please refer to the Site Categories and Definitions factsheet for further information.

What does Environment Canterbury do with the information on the LLUR?

The LLUR is available online at www.llur.ecan.govt.nz. We mainly receive enquiries from potential property buyers and environmental consultants or engineers working on sites. An inquirer would typically receive a summary of any information we hold, including the category assigned to the site and a list of any investigation reports.

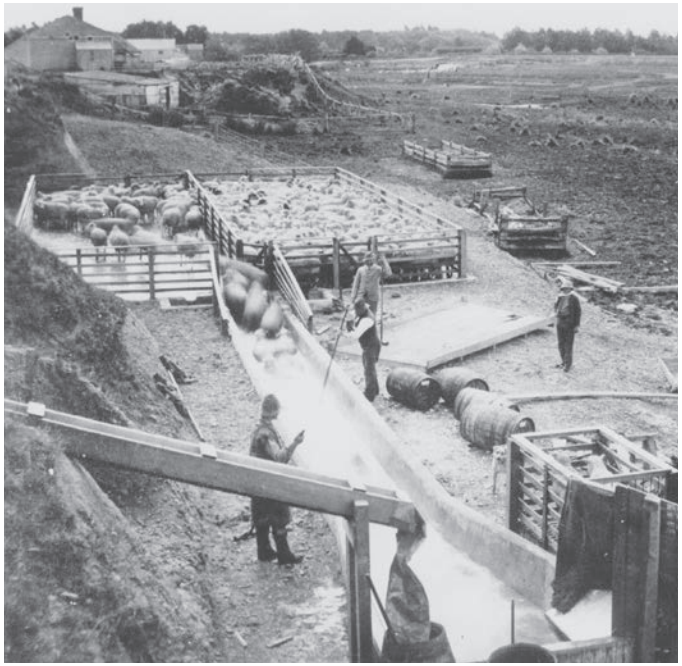
We may also use the information to prioritise sites for further investigation, remediation and management, to aid with planning, and to help assess resource consent applications. These are some of our other responsibilities under the RMA.

If you are conducting an environmental investigation or removing an underground storage tank at your property, you will need to comply with the rules in the Regional Plan and send us a copy of the report. This means we can keep our records accurate and up-to-date, and we can assign your property an appropriate category on the LLUR. To find out more, visit www.ecan.govt.nz/HAIL.



IMPORTANT!

The LLUR is an online database which we are continually updating. A property may not currently be registered on the LLUR, but this does not necessarily mean that it hasn't had a HAIL use in the past.



Sheep dipping (ABOVE) and gas works (TOP) are among the former land uses that have been identified as potentially hazardous. (Photo above by Wheeler & Son in 1987, courtesy of Canterbury Museum.)

My land is on the LLUR – what should I do now?

IMPORTANT! Just because your property has a land use that is deemed hazardous or is on the LLUR, it doesn't necessarily mean it's contaminated. The only way to know if land is contaminated is by carrying out a detailed site investigation, which involves collecting and testing soil samples.

You do not need to do anything if your land is on the LLUR and you have no plans to alter it in any way. It is important that you let a tenant or buyer know your land is on the Listed Land Use Register if you intend to rent or sell your property. If you are not sure what you need to tell the other party, you should seek legal advice.

You may choose to have your property further investigated for your own peace of mind, or because you want to do one of the activities covered by the National Environmental Standard for Assessing and Managing Contaminants in Soil. Your district or city council will provide further information.

If you wish to engage a suitably qualified experienced practitioner to undertake a detailed site investigation, there are criteria for choosing a practitioner on www.ecan.govt.nz/HAIL.

I think my site category is incorrect – how can I change it?

If you have an environmental investigation undertaken at your site, you must send us the report and we will review the LLUR category based on the information you provide. Similarly, if you have information that clearly shows your site has not been associated with HAIL activities (eg. a preliminary site investigation), or if other HAIL activities have occurred which we have not listed, we need to know about it so that our records are accurate.

If we have incorrectly identified that a HAIL activity has occurred at a site, it will be not be removed from the LLUR but categorised as Verified Non-HAIL. This helps us to ensure that the same site is not re-identified in the future.

Contact us

Property owners have the right to look at all the information Environment Canterbury holds about their properties.

It is free to check the information on the LLUR, online at www.llur.ecan.govt.nz.

If you don't have access to the internet, you can enquire about a specific site by phoning us on (03) 353 9007 or toll free on 0800 EC INFO (32 4636) during business hours.

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:
Calling from Christchurch: (03) 353 9007
Calling from any other area: 0800 EC INFO (32 4636)

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz E13/101

Listed Land Use Register

Site categories and definitions

When Environment Canterbury identifies a Hazardous Activities and Industries List (HAIL) land use, we review the available information and assign the site a category on the Listed Land Use Register. The category is intended to best describe what we know about the land use.

If a site is categorised as **Unverified** it means it has been reported or identified as one that appears on the HAIL, but the land use has not been confirmed with the property owner.

If the land use has been confirmed but analytical information from the collection of samples is not available, and the presence or absence of contamination has therefore not been determined, the site is registered as:

Not investigated:

- A site whose past or present use has been reported and verified as one that appears on the HAIL.
- The site has not been investigated, which might typically include sampling and analysis of site soil, water and/or ambient air, and assessment of the associated analytical data.
- There is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

If analytical information from the collection of samples is available, the site can be registered in one of six ways:

At or below background concentrations:

The site has been investigated or remediated. The investigation or post remediation validation results confirm there are no hazardous substances above local background concentrations other than those that occur naturally in the area. The investigation or validation sampling has been sufficiently detailed to characterise the site.

Below guideline values for:

The site has been investigated. Results show that there are hazardous substances present at the site but indicate that any adverse effects or risks to people and/or the environment are considered to be so low as to be acceptable. The site may have been remediated to reduce contamination to this level, and samples taken after remediation confirm this.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Managed for:

The site has been investigated. Results show that there are hazardous substances present at the site in concentrations that have the potential to cause adverse effects or risks to people and/or the environment. However, those risks are considered managed because:

- the nature of the use of the site prevents human and/or ecological exposure to the risks; and/or
- the land has been altered in some way and/or restrictions have been placed on the way it is used which prevent human and/or ecological exposure to the risks.

Partially investigated:

The site has been partially investigated. Results:

- demonstrate there are hazardous substances present at the site; however, there is insufficient information to quantify any adverse effects or risks to people or the environment; or
- do not adequately verify the presence or absence of contamination associated with all HAIL activities that are and/or have been undertaken on the site.

Significant adverse environmental effects:

The site has been investigated. Results show that sediment, groundwater or surface water contains hazardous substances that:

- have significant adverse effects on the environment; or
- are reasonably likely to have significant adverse effects on the environment.

Contaminated:

The site has been investigated. Results show that the land has a hazardous substance in or on it that:

- has significant adverse effects on human health and/or the environment; and/or
- is reasonably likely to have significant adverse effects on human health and/or the environment.

If a site has been included incorrectly on the Listed Land Use Register as having a HAIL, it will not be removed but will be registered as:

Verified non-HAIL:

Information shows that this site has never been associated with any of the specific activities or industries on the HAIL.

Please contact Environment Canterbury for further information:

(03) 353 9007 or toll free
on 0800 EC INFO (32 4636)
email ecinfo@ecan.govt.nz

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

E13/102

APPENDIX 3:

Certificate of Titles – 250 Hamptons Road

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

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

Identifier **CB11A/908**

Land Registration District **Canterbury**

Date Issued 12 October 1971

Prior References
CB7A/116

Estate Fee Simple

Area 8.0887 hectares more or less

Legal Description Lot 1 Deposited Plan 29158

Original Registered Owners
French Bakery Limited

Interests

A393571.2 Mortgage to AMP/ERGO Mortgage and Savings Limited - 4.3.1999 at 12.35 pm

5028331.1 Transfer of Mortgage A393571.2 to AMP Bank Limited - 12.3.2001 at 9:00 am

5080669.1 Discharge of Mortgage A393571.2 - 7.9.2001 at 2:00 pm

5080669.2 Transfer to Charles Alexander McNoe - 7.9.2001 at 2:00 pm

10137360.1 Mortgage to Westpac New Zealand Limited - 31.7.2015 at 11:49 am

10686279.1 Discharge of Mortgage 10137360.1 - 30.3.2017 at 2:39 pm

10686279.2 Transfer to Cairnbrae Developments Limited - 30.3.2017 at 2:39 pm

References
Prior C/T. 7A/116

Transfer No.
N/C. Order No. 845742

Land and Deeds 69

No. 11A/903

REGISTER

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 12th day of October one thousand nine hundred and seventy-one under the seal of the District Land Registrar of the Land Registration District of Canterbury

WITNESSETH that ALFRED ERNEST WHITE of Christchurch, farmer ———

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 19 acres 3 roods 38 perches or thereabouts situated in Block XIII of the Christchurch Survey District being Lot 1 on Deposited Plan 29158, part of Rural Sections 4743 and 4793 ———

DISTRICT LAND REGISTRAR CANTERBURY, N.Z.

Assistant Land Registrar

Transfer 850849 to Edward James Donnithorne of Christchurch, Company Director - 30.11.1971 at 2.40 p.m.

A.L.R.

Mortgage 850850 to Alfred Ernest White - 30.11.1971 at 2.40 p.m.

A.L.R.

Mortgage 881782 to The New Zealand Investment Mortgage and Deposit Company Limited - 20/9/1972 at 2.37 p.m

A.L.R.

No.881783 Settled under the Joint Family Homes Act 1964 onEdward James Donnithorne abovenamed and Doris Girvan Donnithorne his wife - 20/9/1972 at 2.37 p.m

A.L.R.

Transmission 12391/1 of Mortgage 850850 to Sadie May White as Executor - 15.10.1974 at 11.49 a.m.

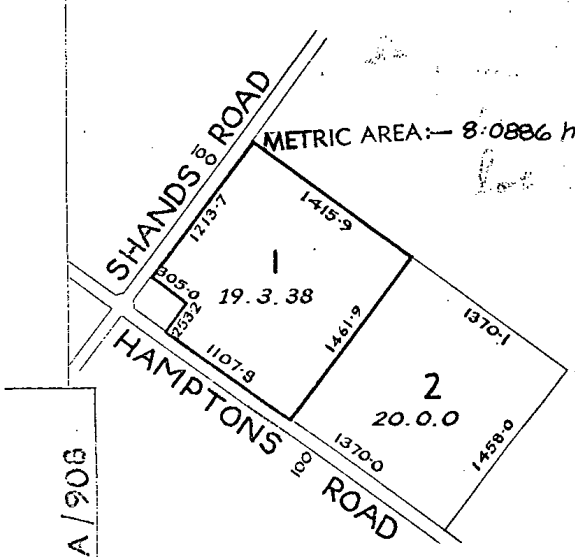
A.L.R.

Transfer 27758/1 of Mortgage 850580 to Sadie May White - 7.3.1975 at 10.49 a.m.

A.L.R.

Mortgage 157003/2 to [illegible] Limited - 23.11.1976 at 12.00 p.m.

A.L.R.



No. 11A/903

OVER

Register copy for L. & D. 69, 71, 72

Transmission 425806/1 to Doris Girvan Donnithorne, above-named, now a Widow as Survivor - 21-3-1983 at 9.06a.m.

for A.L.R.

Transmission 797750/1 to Allan Edwin George Elsom, Company Director and Alan Kendrick Archer, Solicitor, both of Christchurch as Executors - 10.4.1989 at 9.01am

for A.L.R.

Transfer 797750/2 to Laraine Beatrice Georgeson of Dunedin, Married Woman - 10.4.1989 at 9.01am

for A.L.R.

Mortgage 797750/3 to Trust Bank Canterbury Limited - 10.4.1989 at 9.01am

DISCHARGED 19/12/90 A.L.R.

for A.L.R.

Mortgage 797750/4 to Colin James Harvey - 10.4.1989 at 9.01am

DISCHARGED 24/8/1989 A.L.R.

for A.L.R.

Mortgage 823343/2 to Finance and Discounts Limited - 24.8.1989 at 11.05am

DISCHARGED 19/12/90 A.L.R.

for A.L.R.

Transfer 913447/3 to Philip James Donnithorne of Christchurch, Manager and Louise Carolyn Donnithorne his wife - 19.12.1990 at 9.52am

for A.L.R.

Mortgage 913447/4 to Trust Bank Canterbury Limited - 19.12.1990 at 9.52am

DISCHARGED 19 OCT 1993 A.L.R.

for A.L.R.

Variation of Mortgage 913447/4 - 24.2.1992 at 10.15am

A.L.R.

Transfer A76221/2 to French Bakery Limited at Christchurch - 14.10.1993 at 11.40am

for A.L.R.

Mortgage A76221/3 to ANZ Banking Group (New Zealand) Limited - 14.10.1993 at 11.40am

DISCHARGED 4.3.1999 RGL

for A.L.R.

A393571.2 Mortgage to AMP/ERGO Mortgage and Savings Limited - 4.3.1999 at 12.35

for RGL

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

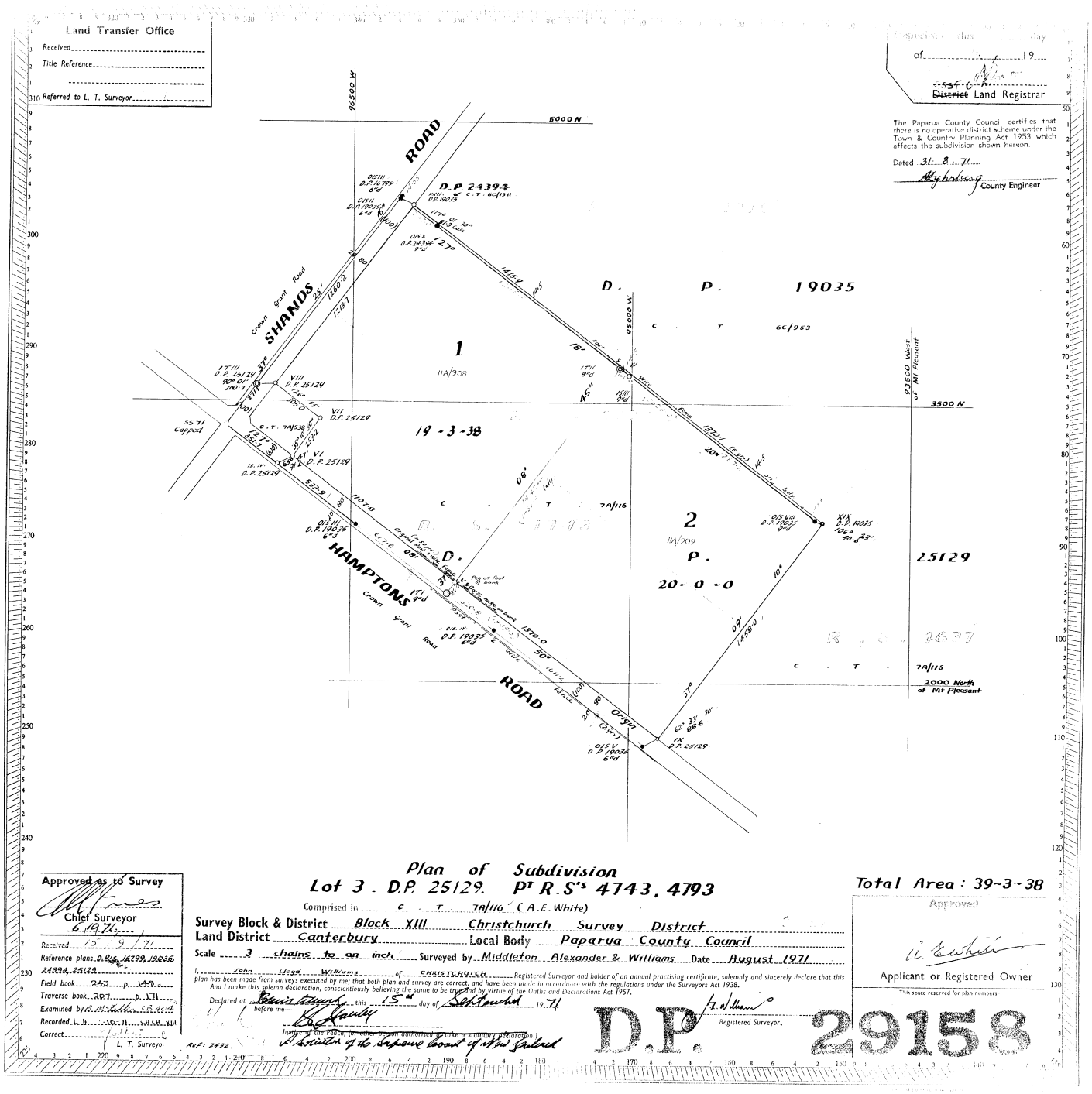
Identifier	**CB11A/908**
Land Registration District	**Canterbury**
Date Issued	12 October 1971

Prior References
CB7A/116

Estate	Fee Simple
Area	8.0887 hectares more or less
Legal Description	Lot 1 Deposited Plan 29158
Registered Owners	

Cairnbrae Developments Limited

Interests


Land Transfer Office
Received
Title Reference
Referred to L. T. Surveyor
Registered this day of 19
District Land Registrar
The Paparua County Council certifies that there is no operative district scheme under the Town & Country Planning Act 1953 which affects the subdivision shown hereon.
Dated 31 8 71
County Engineer
ROAD
SHANDS
Crown Grant Road
HAMPTONS
Crown Grant Road
ROAD
D.P 24394
D. P. 19035
C. T. 6C/953
1
IIA/908
19-3-38
2
IIA/909
P. 25129
20-0-0
C. T. 7A/116
C. T. 7A/115
5000 N
3500 N
95500 W
92500 West of Mt Pleasant
2000 North of Mt Pleasant
Plan of Subdivision
Lot 3 D.P. 25129. Pt R.S's 4743, 4793
Total Area: 39-3-38
Comprised in C. T. 7A/116 (A.E. White)
Survey Block & District Block XIII Christchurch Survey District
Land District Canterbury Local Body Paparua County Council
Scale 3 chains to an inch Surveyed by Middleton Alexander & Williams Date August 1971
Approved as to Survey
Chief Surveyor
6.10.71
Received 13 9 71
Reference plans D.P.s 16799, 19035, 24394, 25129
Field book 243 p. 120
Traverse book 207 p. 171
Examined by
Recorded
Correct
L. T. Surveyor
Ref: 2432
Approved
Applicant or Registered Owner
This space reserved for plan numbers
D.P. 29158

APPENDIX 4:

Laboratory Certificates

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:	Engeo Limited	**Lab No:**	2453715 SPv1
Contact:	Natalie Flatman C/- Engeo Limited PO Box 373 Christchurch 8140	**Date Received:**	12-Oct-2020
		Date Reported:	16-Oct-2020
		Quote No:	107705
		Order No:	
		Client Reference:	P2020.002.259_232
		Submitted By:	Natalie Flatman

Sample Type: Soil

Sample Name:		A2S1 12-Oct-2020	A25S2 12-Oct-2020	A2S3 12-Oct-2020	A3S1 12-Oct-2020	A3S2 12-Oct-2020
Lab Number:		2453715.1	2453715.2	2453715.3	2453715.4	2453715.5
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	83	87
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	10	15	13	5	5
Total Recoverable Cadmium	mg/kg dry wt	0.55	1.48	0.51	0.15	0.20
Total Recoverable Chromium	mg/kg dry wt	23	37	29	15	17
Total Recoverable Copper	mg/kg dry wt	31	79	32	9	220
Total Recoverable Lead	mg/kg dry wt	165	86	108	24	42
Total Recoverable Nickel	mg/kg dry wt	12	23	15	12	14
Total Recoverable Zinc	mg/kg dry wt	540	1,060	500	86	104
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	< 8	< 8
C10 - C14	mg/kg dry wt	-	-	-	< 20	< 20
C15 - C36	mg/kg dry wt	-	-	-	56	44
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	< 70	< 70

Sample Name:		A3S3 12-Oct-2020	A3S4 12-Oct-2020	A3S5 12-Oct-2020	A3S6 12-Oct-2020	A3S7 12-Oct-2020
Lab Number:		2453715.6	2453715.7	2453715.8	2453715.9	2453715.10
Individual Tests						
Dry Matter	g/100g as rcvd	85	87	85	80	85
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	6	6	6	5	6
Total Recoverable Cadmium	mg/kg dry wt	0.39	0.29	0.26	0.19	0.20
Total Recoverable Chromium	mg/kg dry wt	16	18	16	17	16
Total Recoverable Copper	mg/kg dry wt	9	10	60	10	11
Total Recoverable Lead	mg/kg dry wt	28	54	51	30	80
Total Recoverable Nickel	mg/kg dry wt	12	13	15	12	12
Total Recoverable Zinc	mg/kg dry wt	84	87	118	87	156
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	< 8	< 8	< 8
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	51	65	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	< 70	70	< 70	< 70

Sample Type: Soil						
Sample Name:		A3S8 12-Oct-2020	A3S9 12-Oct-2020	A3S10 12-Oct-2020	A3S11 12-Oct-2020	A4S1 12-Oct-2020
Lab Number:		2453715.11	2453715.12	2453715.13	2453715.14	2453715.15
Individual Tests						
Dry Matter	g/100g as rcvd	82	85	90	87	84
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	10	5	5	6	5
Total Recoverable Cadmium	mg/kg dry wt	0.18	0.24	0.68	0.56	0.14
Total Recoverable Chromium	mg/kg dry wt	17	16	16	17	13
Total Recoverable Copper	mg/kg dry wt	10	9	14	10	7
Total Recoverable Lead	mg/kg dry wt	37	24	69	35	28
Total Recoverable Nickel	mg/kg dry wt	13	12	16	13	9
Total Recoverable Zinc	mg/kg dry wt	101	81	156	88	70
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	< 8	< 8	< 8
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	68	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 70	74	< 70	< 70	< 70

Sample Name:		A4S2 12-Oct-2020	A4S3 12-Oct-2020	A4S4 12-Oct-2020	A5S1 12-Oct-2020	A5S2 12-Oct-2020
Lab Number:		2453715.16	2453715.17	2453715.18	2453715.19	2453715.20
Individual Tests						
Dry Matter	g/100g as rcvd	76	88	78	90	87
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	8	5	4	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.20	0.22	0.16	-	-
Total Recoverable Chromium	mg/kg dry wt	15	14	13	-	-
Total Recoverable Copper	mg/kg dry wt	11	6	8	-	-
Total Recoverable Lead	mg/kg dry wt	31	26	23	-	-
Total Recoverable Nickel	mg/kg dry wt	10	9	8	-	-
Total Recoverable Zinc	mg/kg dry wt	136	74	80	-	-
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	5	4
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	< 0.10	0.13
Total Recoverable Chromium	mg/kg dry wt	-	-	-	15	14
Total Recoverable Copper	mg/kg dry wt	-	-	-	7	6
Total Recoverable Lead	mg/kg dry wt	-	-	-	20	19.8
Total Recoverable Mercury	mg/kg dry wt	-	-	-	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	-	-	-	9	10
Total Recoverable Zinc	mg/kg dry wt	-	-	-	66	68
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	< 0.011	< 0.012
alpha-BHC	mg/kg dry wt	-	-	-	< 0.011	< 0.012
beta-BHC	mg/kg dry wt	-	-	-	< 0.011	< 0.012
delta-BHC	mg/kg dry wt	-	-	-	< 0.011	< 0.012
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.011	< 0.012
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.011	< 0.012
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.011	< 0.012
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.011	< 0.012
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.011	< 0.012
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.011	< 0.012
4,4'-DDE	mg/kg dry wt	-	-	-	< 0.011	< 0.012
2,4'-DDT	mg/kg dry wt	-	-	-	< 0.011	< 0.012
4,4'-DDT	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Total DDT Isomers	mg/kg dry wt	-	-	-	< 0.07	< 0.07
Dieldrin	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Endosulfan I	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Endosulfan II	mg/kg dry wt	-	-	-	< 0.011	< 0.012

Sample Type: Soil						
Sample Name:		A4S2 12-Oct-2020	A4S3 12-Oct-2020	A4S4 12-Oct-2020	A5S1 12-Oct-2020	A5S2 12-Oct-2020
Lab Number:		2453715.16	2453715.17	2453715.18	2453715.19	2453715.20
Organochlorine Pesticides Screening in Soil						
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Endrin	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Endrin ketone	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Heptachlor	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Methoxychlor	mg/kg dry wt	-	-	-	< 0.011	< 0.012
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Acetochlor	mg/kg	-	-	-	< 0.06	< 0.06
Alachlor	mg/kg	-	-	-	< 0.05	< 0.05
Atrazine	mg/kg	-	-	-	< 0.06	< 0.06
Atrazine-desethyl	mg/kg	-	-	-	< 0.06	< 0.06
Atrazine-desisopropyl	mg/kg	-	-	-	< 0.11	< 0.11
Azaconazole	mg/kg	-	-	-	< 0.03	< 0.03
Azinphos-methyl	mg/kg	-	-	-	< 0.11	< 0.11
Benalaxyl	mg/kg	-	-	-	< 0.03	< 0.03
Bitertanol	mg/kg	-	-	-	< 0.11	< 0.11
Bromacil	mg/kg	-	-	-	< 0.06	< 0.06
Bromopropylate	mg/kg	-	-	-	< 0.06	< 0.06
Butachlor	mg/kg	-	-	-	< 0.06	< 0.06
Captan	mg/kg	-	-	-	< 0.11	< 0.11
Carbaryl	mg/kg	-	-	-	< 0.06	< 0.06
Carbofuran	mg/kg	-	-	-	< 0.06	< 0.06
Chlorfluazuron	mg/kg	-	-	-	< 0.06	< 0.06
Chlorothalonil	mg/kg	-	-	-	< 0.06	< 0.06
Chlorpyrifos	mg/kg	-	-	-	< 0.06	< 0.06
Chlorpyrifos-methyl	mg/kg	-	-	-	< 0.06	< 0.06
Chlortoluron	mg/kg	-	-	-	< 0.11	< 0.11
Cyanazine	mg/kg	-	-	-	< 0.06	< 0.06
Cyfluthrin	mg/kg	-	-	-	< 0.07	< 0.07
Cyhalothrin	mg/kg	-	-	-	< 0.06	< 0.06
Cypermethrin	mg/kg	-	-	-	< 0.13	< 0.14
Deltamethrin (including Tralomethrin)	mg/kg	-	-	-	< 0.06	< 0.06
Diazinon	mg/kg	-	-	-	< 0.03	< 0.03
Dichlofluanid	mg/kg	-	-	-	< 0.06	< 0.06
Dichloran	mg/kg	-	-	-	< 0.2	< 0.2
Dichlorvos	mg/kg	-	-	-	< 0.09	< 0.09
Difenoconazole	mg/kg	-	-	-	< 0.09	< 0.09
Dimethoate	mg/kg	-	-	-	< 0.11	< 0.11
Diphenylamine	mg/kg	-	-	-	< 0.11	< 0.11
Diuron	mg/kg	-	-	-	< 0.06	< 0.06
Fenpropimorph	mg/kg	-	-	-	< 0.06	< 0.06
Fluazifop-butyl	mg/kg	-	-	-	< 0.06	< 0.06
Fluometuron	mg/kg	-	-	-	< 0.06	< 0.06
Flusilazole	mg/kg	-	-	-	< 0.06	< 0.06
Fluvalinate	mg/kg	-	-	-	< 0.05	< 0.05
Furalaxyl	mg/kg	-	-	-	< 0.03	< 0.03
Haloxyfop-methyl	mg/kg	-	-	-	< 0.06	< 0.06
Hexaconazole	mg/kg	-	-	-	< 0.06	< 0.06
Hexazinone	mg/kg	-	-	-	< 0.03	< 0.03
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	-	-	-	< 0.3	< 0.3
Kresoxim-methyl	mg/kg	-	-	-	< 0.03	< 0.03
Linuron	mg/kg	-	-	-	< 0.06	< 0.06

Sample Type: Soil						
Sample Name:		A4S2 12-Oct-2020	A4S3 12-Oct-2020	A4S4 12-Oct-2020	A5S1 12-Oct-2020	A5S2 12-Oct-2020
Lab Number:		2453715.16	2453715.17	2453715.18	2453715.19	2453715.20
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Malathion	mg/kg	-	-	-	< 0.06	< 0.06
Metalaxyl (Mefenoxam)	mg/kg	-	-	-	< 0.06	< 0.06
Methamidophos	mg/kg	-	-	-	< 0.3	< 0.3
Metolachlor	mg/kg	-	-	-	< 0.05	< 0.05
Metribuzin	mg/kg	-	-	-	< 0.06	< 0.06
Molinate	mg/kg	-	-	-	< 0.11	< 0.11
Myclobutanil	mg/kg	-	-	-	< 0.06	< 0.06
Naled	mg/kg	-	-	-	< 0.3	< 0.3
Norflurazon	mg/kg	-	-	-	< 0.11	< 0.11
Oxadiazon	mg/kg	-	-	-	< 0.06	< 0.06
Oxyfluorfen	mg/kg	-	-	-	< 0.03	< 0.03
Paclobutrazol	mg/kg	-	-	-	< 0.06	< 0.06
Parathion-ethyl	mg/kg	-	-	-	< 0.06	< 0.06
Parathion-methyl	mg/kg	-	-	-	< 0.06	< 0.06
Pendimethalin	mg/kg	-	-	-	< 0.06	< 0.06
Permethrin	mg/kg	-	-	-	< 0.03	< 0.03
Pirimicarb	mg/kg	-	-	-	< 0.06	< 0.06
Pirimiphos-methyl	mg/kg	-	-	-	< 0.06	< 0.06
Prochloraz	mg/kg	-	-	-	< 0.3	< 0.3
Procymidone	mg/kg	-	-	-	< 0.06	< 0.06
Prometryn	mg/kg	-	-	-	< 0.03	< 0.03
Propachlor	mg/kg	-	-	-	< 0.06	< 0.06
Propanil	mg/kg	-	-	-	< 0.2	< 0.2
Propazine	mg/kg	-	-	-	< 0.03	< 0.03
Propiconazole	mg/kg	-	-	-	< 0.05	< 0.05
Pyriproxyfen	mg/kg	-	-	-	< 0.06	< 0.06
Quizalofop-ethyl	mg/kg	-	-	-	< 0.06	< 0.06
Simazine	mg/kg	-	-	-	< 0.06	< 0.06
Simetryn	mg/kg	-	-	-	< 0.06	< 0.06
Sulfentrazone	mg/kg	-	-	-	< 0.3	< 0.3
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	-	-	-	< 0.11	< 0.11
Tebuconazole	mg/kg	-	-	-	< 0.06	< 0.06
Terbacil	mg/kg	-	-	-	< 0.06	< 0.06
Terbufos	mg/kg	-	-	-	< 0.06	< 0.06
Terbumeton	mg/kg	-	-	-	< 0.06	< 0.06
Terbuthylazine	mg/kg	-	-	-	< 0.03	< 0.03
Terbuthylazine-desethyl	mg/kg	-	-	-	< 0.06	< 0.06
Terbutryn	mg/kg	-	-	-	< 0.06	< 0.06
Thiabendazole	mg/kg	-	-	-	< 0.3	< 0.3
Thiobencarb	mg/kg	-	-	-	< 0.06	< 0.06
Tolylfluanid	mg/kg	-	-	-	< 0.03	< 0.03
Triazophos	mg/kg	-	-	-	< 0.06	< 0.06
Trifluralin	mg/kg	-	-	-	< 0.06	< 0.06
Vinclozolin	mg/kg	-	-	-	< 0.06	< 0.06
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 8	< 8	< 8	-	-
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	-	-
C15 - C36	mg/kg dry wt	175	57	138	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	185	< 70	147	-	-

Sample Name:	A5S3 12-Oct-2020	A5S4 12-Oct-2020	A5S5 12-Oct-2020	A5S6 12-Oct-2020	A6S1 12-Oct-2020
Lab Number:	2453715.21	2453715.22	2453715.23	2453715.24	2453715.25

Sample Type: Soil						
Sample Name:		A5S3 12-Oct-2020	A5S4 12-Oct-2020	A5S5 12-Oct-2020	A5S6 12-Oct-2020	A6S1 12-Oct-2020
Lab Number:		2453715.21	2453715.22	2453715.23	2453715.24	2453715.25
Individual Tests						
Dry Matter	g/100g as rcvd	88	89	95	90	84
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	-	5
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	-	0.14
Total Recoverable Chromium	mg/kg dry wt	-	-	-	-	14
Total Recoverable Copper	mg/kg dry wt	-	-	-	-	16
Total Recoverable Lead	mg/kg dry wt	-	-	-	-	60
Total Recoverable Nickel	mg/kg dry wt	-	-	-	-	10
Total Recoverable Zinc	mg/kg dry wt	-	-	-	-	220
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	3	4	4	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.12	0.14	0.12	-
Total Recoverable Chromium	mg/kg dry wt	13	13	13	13	-
Total Recoverable Copper	mg/kg dry wt	7	7	7	7	-
Total Recoverable Lead	mg/kg dry wt	19.6	17.5	18.7	18.7	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	-
Total Recoverable Nickel	mg/kg dry wt	10	9	7	7	-
Total Recoverable Zinc	mg/kg dry wt	74	68	69	69	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
alpha-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
beta-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
delta-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
cis-Chlordane	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
trans-Chlordane	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
2,4'-DDD	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
4,4'-DDD	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
2,4'-DDE	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
4,4'-DDE	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
2,4'-DDT	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
4,4'-DDT	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Total DDT Isomers	mg/kg dry wt	< 0.07	< 0.07	< 0.07	< 0.07	-
Dieldrin	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endosulfan I	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endosulfan II	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endosulfan sulphate	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endrin	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endrin aldehyde	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endrin ketone	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Heptachlor	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Heptachlor epoxide	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Hexachlorobenzene	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Methoxychlor	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Acetochlor	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Alachlor	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Atrazine	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Atrazine-desethyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Atrazine-desisopropyl	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Azaconazole	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Azinphos-methyl	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Benalaxyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Bitertanol	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Bromacil	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-

Sample Type: Soil						
Sample Name:		A5S3 12-Oct-2020	A5S4 12-Oct-2020	A5S5 12-Oct-2020	A5S6 12-Oct-2020	A6S1 12-Oct-2020
Lab Number:		2453715.21	2453715.22	2453715.23	2453715.24	2453715.25
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Bromopropylate	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Butachlor	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Captan	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Carbaryl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Carbofuran	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Chlorfluazuron	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Chlorothalonil	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Chlorpyrifos	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Chlorpyrifos-methyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Chlortoluron	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Cyanazine	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Cyfluthrin	mg/kg	< 0.07	< 0.07	< 0.07	< 0.07	-
Cyhalothrin	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Cypermethrin	mg/kg	< 0.14	< 0.13	< 0.13	< 0.13	-
Deltamethrin (including Tralomethrin)	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Diazinon	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Dichlofluanid	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Dichloran	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	-
Dichlorvos	mg/kg	< 0.09	< 0.09	< 0.09	< 0.09	-
Difenoconazole	mg/kg	< 0.09	< 0.09	< 0.09	< 0.09	-
Dimethoate	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Diphenylamine	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Diuron	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Fenpropimorph	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Fluazifop-butyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Fluometuron	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Flusilazole	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Fluvalinate	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Furalaxyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Haloxyfop-methyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Hexaconazole	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Hexazinone	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	< 0.3	< 0.3	< 0.3	< 0.3	-
Kresoxim-methyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Linuron	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Malathion	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Metalaxyl (Mefenoxam)	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Methamidophos	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Metolachlor	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Metribuzin	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Molinate	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Myclobutanil	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Naled	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Norflurazon	mg/kg	< 0.11	< 0.11	< 0.10	< 0.11	-
Oxadiazon	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Oxyfluorfen	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Paclobutrazol	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Parathion-ethyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Parathion-methyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Pendimethalin	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Permethrin	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Pirimicarb	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Pirimiphos-methyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Prochloraz	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-

Sample Type: Soil						
Sample Name:		A5S3 12-Oct-2020	A5S4 12-Oct-2020	A5S5 12-Oct-2020	A5S6 12-Oct-2020	A6S1 12-Oct-2020
Lab Number:		2453715.21	2453715.22	2453715.23	2453715.24	2453715.25
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Procymidone	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Prometryn	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Propachlor	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Propanil	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	-
Propazine	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Propiconazole	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Pyriproxyfen	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Quizalofop-ethyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Simazine	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Simetryn	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Sulfentrazone	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	< 0.11	< 0.11	< 0.10	< 0.11	-
Tebuconazole	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Terbacil	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Terbufos	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Terbumeton	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Terbuthylazine	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Terbuthylazine-desethyl	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Terbutryn	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Thiabendazole	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Thiobencarb	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Tolylfluanid	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Triazophos	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Trifluralin	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Vinclozolin	mg/kg	< 0.06	< 0.06	< 0.05	< 0.06	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	-	< 0.3
1-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.012
2-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.012
Acenaphthylene	mg/kg dry wt	-	-	-	-	< 0.012
Acenaphthene	mg/kg dry wt	-	-	-	-	< 0.012
Anthracene	mg/kg dry wt	-	-	-	-	< 0.012
Benzo[a]anthracene	mg/kg dry wt	-	-	-	-	0.020
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	-	0.020
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	0.03
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	0.03
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	-	0.030
Benzo[e]pyrene	mg/kg dry wt	-	-	-	-	0.022
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	-	0.019
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	-	< 0.012
Chrysene	mg/kg dry wt	-	-	-	-	0.018
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	-	< 0.012
Fluoranthene	mg/kg dry wt	-	-	-	-	0.028
Fluorene	mg/kg dry wt	-	-	-	-	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	-	0.017
Naphthalene	mg/kg dry wt	-	-	-	-	< 0.06
Perylene	mg/kg dry wt	-	-	-	-	< 0.012
Phenanthrene	mg/kg dry wt	-	-	-	-	0.014
Pyrene	mg/kg dry wt	-	-	-	-	0.026

Sample Type: Soil						
Sample Name:		A6S2 12-Oct-2020	A6S3 12-Oct-2020	A6S4 12-Oct-2020	A6S5 12-Oct-2020	A7S1 12-Oct-2020
Lab Number:		2453715.26	2453715.27	2453715.28	2453715.29	2453715.30
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	-	75
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	5	6	4	-
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.16	0.25	< 0.10	-
Total Recoverable Chromium	mg/kg dry wt	15	15	14	14	-
Total Recoverable Copper	mg/kg dry wt	11	12	13	8	-
Total Recoverable Lead	mg/kg dry wt	56	63	94	31	-
Total Recoverable Nickel	mg/kg dry wt	10	10	10	10	-
Total Recoverable Zinc	mg/kg dry wt	151	162	290	92	-
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	-	5
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	-	0.36
Total Recoverable Chromium	mg/kg dry wt	-	-	-	-	13
Total Recoverable Copper	mg/kg dry wt	-	-	-	-	18
Total Recoverable Lead	mg/kg dry wt	-	-	-	-	360
Total Recoverable Mercury	mg/kg dry wt	-	-	-	-	< 0.10
Total Recoverable Nickel	mg/kg dry wt	-	-	-	-	10
Total Recoverable Zinc	mg/kg dry wt	-	-	-	-	370
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	-	-	-	-	< 0.08
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
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Acetochlor	mg/kg	-	-	-	-	< 0.07
Alachlor	mg/kg	-	-	-	-	< 0.05
Atrazine	mg/kg	-	-	-	-	< 0.07
Atrazine-desethyl	mg/kg	-	-	-	-	< 0.07
Atrazine-desisopropyl	mg/kg	-	-	-	-	< 0.13
Azaconazole	mg/kg	-	-	-	-	< 0.04
Azinphos-methyl	mg/kg	-	-	-	-	< 0.13
Benalaxyl	mg/kg	-	-	-	-	< 0.04
Bitertanol	mg/kg	-	-	-	-	< 0.13
Bromacil	mg/kg	-	-	-	-	< 0.07

Sample Type: Soil						
Sample Name:		A6S2 12-Oct-2020	A6S3 12-Oct-2020	A6S4 12-Oct-2020	A6S5 12-Oct-2020	A7S1 12-Oct-2020
Lab Number:		2453715.26	2453715.27	2453715.28	2453715.29	2453715.30
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Bromopropylate	mg/kg	-	-	-	-	< 0.07
Butachlor	mg/kg	-	-	-	-	< 0.07
Captan	mg/kg	-	-	-	-	< 0.13
Carbaryl	mg/kg	-	-	-	-	< 0.07
Carbofuran	mg/kg	-	-	-	-	< 0.07
Chlorfluazuron	mg/kg	-	-	-	-	< 0.07
Chlorothalonil	mg/kg	-	-	-	-	< 0.07
Chlorpyrifos	mg/kg	-	-	-	-	< 0.07
Chlorpyrifos-methyl	mg/kg	-	-	-	-	< 0.07
Chlortoluron	mg/kg	-	-	-	-	< 0.13
Cyanazine	mg/kg	-	-	-	-	< 0.07
Cyfluthrin	mg/kg	-	-	-	-	< 0.08
Cyhalothrin	mg/kg	-	-	-	-	< 0.07
Cypermethrin	mg/kg	-	-	-	-	< 0.16
Deltamethrin (including Tralomethrin)	mg/kg	-	-	-	-	< 0.07
Diazinon	mg/kg	-	-	-	-	< 0.04
Dichlofluanid	mg/kg	-	-	-	-	< 0.07
Dichloran	mg/kg	-	-	-	-	< 0.2
Dichlorvos	mg/kg	-	-	-	-	< 0.09
Difenoconazole	mg/kg	-	-	-	-	< 0.09
Dimethoate	mg/kg	-	-	-	-	< 0.13
Diphenylamine	mg/kg	-	-	-	-	< 0.13
Diuron	mg/kg	-	-	-	-	< 0.07
Fenpropimorph	mg/kg	-	-	-	-	< 0.07
Fluazifop-butyl	mg/kg	-	-	-	-	< 0.07
Fluometuron	mg/kg	-	-	-	-	< 0.07
Flusilazole	mg/kg	-	-	-	-	< 0.07
Fluvalinate	mg/kg	-	-	-	-	< 0.05
Furalaxyl	mg/kg	-	-	-	-	< 0.04
Haloxyfop-methyl	mg/kg	-	-	-	-	< 0.07
Hexaconazole	mg/kg	-	-	-	-	< 0.07
Hexazinone	mg/kg	-	-	-	-	< 0.04
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	-	-	-	-	< 0.4
Kresoxim-methyl	mg/kg	-	-	-	-	< 0.04
Linuron	mg/kg	-	-	-	-	< 0.07
Malathion	mg/kg	-	-	-	-	< 0.07
Metalaxyl (Mefenoxam)	mg/kg	-	-	-	-	< 0.07
Methamidophos	mg/kg	-	-	-	-	< 0.4
Metolachlor	mg/kg	-	-	-	-	< 0.05
Metribuzin	mg/kg	-	-	-	-	< 0.07
Molinate	mg/kg	-	-	-	-	< 0.13
Myclobutanil	mg/kg	-	-	-	-	< 0.07
Naled	mg/kg	-	-	-	-	< 0.4
Norflurazon	mg/kg	-	-	-	-	< 0.13
Oxadiazon	mg/kg	-	-	-	-	< 0.07
Oxyfluorfen	mg/kg	-	-	-	-	< 0.04
Paclobutrazol	mg/kg	-	-	-	-	< 0.07
Parathion-ethyl	mg/kg	-	-	-	-	< 0.07
Parathion-methyl	mg/kg	-	-	-	-	< 0.07
Pendimethalin	mg/kg	-	-	-	-	< 0.07
Permethrin	mg/kg	-	-	-	-	< 0.03
Pirimicarb	mg/kg	-	-	-	-	< 0.07
Pirimiphos-methyl	mg/kg	-	-	-	-	< 0.07
Prochloraz	mg/kg	-	-	-	-	< 0.4

Sample Type: Soil						
Sample Name:		A6S2 12-Oct-2020	A6S3 12-Oct-2020	A6S4 12-Oct-2020	A6S5 12-Oct-2020	A7S1 12-Oct-2020
Lab Number:		2453715.26	2453715.27	2453715.28	2453715.29	2453715.30
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Procymidone	mg/kg	-	-	-	-	< 0.07
Prometryn	mg/kg	-	-	-	-	< 0.04
Propachlor	mg/kg	-	-	-	-	< 0.07
Propanil	mg/kg	-	-	-	-	< 0.2
Propazine	mg/kg	-	-	-	-	< 0.04
Propiconazole	mg/kg	-	-	-	-	< 0.05
Pyriproxyfen	mg/kg	-	-	-	-	< 0.07
Quizalofop-ethyl	mg/kg	-	-	-	-	< 0.07
Simazine	mg/kg	-	-	-	-	< 0.07
Simetryn	mg/kg	-	-	-	-	< 0.07
Sulfentrazone	mg/kg	-	-	-	-	< 0.4
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	-	-	-	-	< 0.13
Tebuconazole	mg/kg	-	-	-	-	< 0.07
Terbacil	mg/kg	-	-	-	-	< 0.07
Terbufos	mg/kg	-	-	-	-	< 0.07
Terbumeton	mg/kg	-	-	-	-	< 0.07
Terbuthylazine	mg/kg	-	-	-	-	< 0.04
Terbuthylazine-desethyl	mg/kg	-	-	-	-	< 0.07
Terbutryn	mg/kg	-	-	-	-	< 0.07
Thiabendazole	mg/kg	-	-	-	-	< 0.4
Thiobencarb	mg/kg	-	-	-	-	< 0.07
Tolylfluanid	mg/kg	-	-	-	-	< 0.04
Triazophos	mg/kg	-	-	-	-	< 0.07
Trifluralin	mg/kg	-	-	-	-	< 0.07
Vinclozolin	mg/kg	-	-	-	-	< 0.07

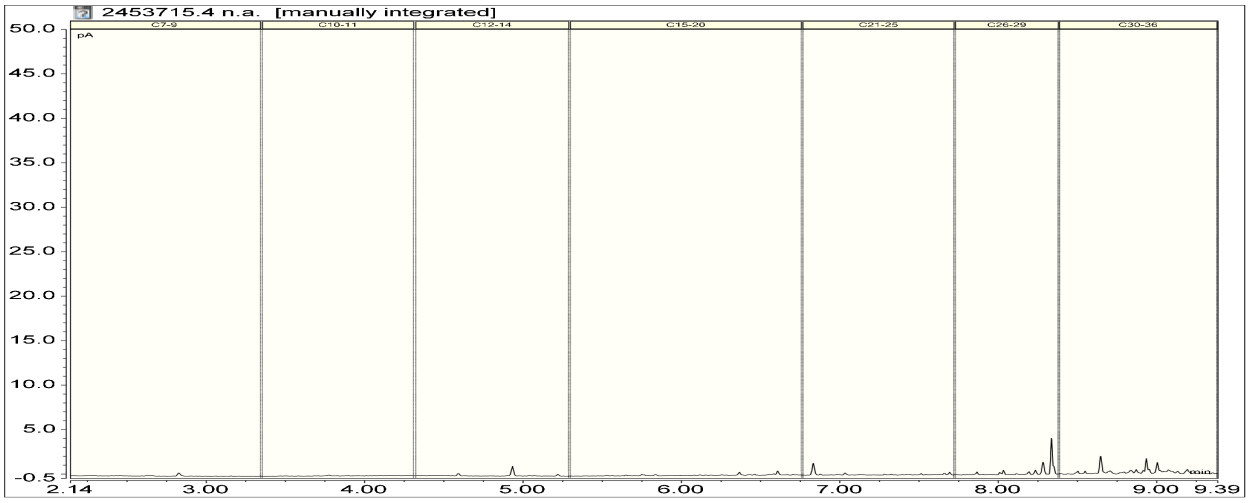
Sample Name:		A7S2 12-Oct-2020	A7S3 12-Oct-2020	A7S4 12-Oct-2020	A7S5 12-Oct-2020	A8S1 12-Oct-2020
Lab Number:		2453715.31	2453715.32	2453715.33	2453715.34	2453715.35
Individual Tests						
Dry Matter	g/100g as rcvd	79	83	79	85	80
Heavy metals, MacroDig, screen, As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	-	7 #1
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	-	2.2 #2
Total Recoverable Chromium	mg/kg dry wt	-	-	-	-	63 #3
Total Recoverable Copper	mg/kg dry wt	-	-	-	-	34 #4
Total Recoverable Lead	mg/kg dry wt	-	-	-	-	1,260 #5
Total Recoverable Nickel	mg/kg dry wt	-	-	-	-	12 #2
Total Recoverable Zinc	mg/kg dry wt	-	-	-	-	760 #2
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	3	3	5	-
Total Recoverable Cadmium	mg/kg dry wt	0.40	< 0.10	< 0.10	< 0.10	-
Total Recoverable Chromium	mg/kg dry wt	14	13	13	14	-
Total Recoverable Copper	mg/kg dry wt	12	7	8	7	-
Total Recoverable Lead	mg/kg dry wt	340	24	32	17.8	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	-
Total Recoverable Nickel	mg/kg dry wt	11	9	10	11	-
Total Recoverable Zinc	mg/kg dry wt	420	71	84	86	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
alpha-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
beta-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
delta-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-

Sample Type: Soil						
Sample Name:		A7S2 12-Oct-2020	A7S3 12-Oct-2020	A7S4 12-Oct-2020	A7S5 12-Oct-2020	A8S1 12-Oct-2020
Lab Number:		2453715.31	2453715.32	2453715.33	2453715.34	2453715.35
Organochlorine Pesticides Screening in Soil						
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
4,4'-DDD	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
4,4'-DDE	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
2,4'-DDT	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
4,4'-DDT	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.08	< 0.08	< 0.07	-
Dieldrin	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Endosulfan I	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Endosulfan II	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Endrin	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Endrin ketone	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Heptachlor	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Methoxychlor	mg/kg dry wt	< 0.013	< 0.013	< 0.013	< 0.012	-
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Acetochlor	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Alachlor	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Atrazine	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Atrazine-desethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Atrazine-desisopropyl	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Azaconazole	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Azinphos-methyl	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Benalaxyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Bitertanol	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Bromacil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Bromopropylate	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Butachlor	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Captan	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Carbaryl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Carbofuran	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorfluazuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorothalonil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorpyrifos	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorpyrifos-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlortoluron	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Cyanazine	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Cyfluthrin	mg/kg	< 0.08	< 0.07	< 0.08	< 0.07	-
Cyhalothrin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Cypermethrin	mg/kg	< 0.15	< 0.14	< 0.15	< 0.14	-
Deltamethrin (including Tralomethrin)	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Diazinon	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Dichlofluanid	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Dichloran	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	-
Dichlorvos	mg/kg	< 0.09	< 0.09	< 0.09	< 0.09	-
Difenoconazole	mg/kg	< 0.09	< 0.09	< 0.09	< 0.09	-
Dimethoate	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Diphenylamine	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Diuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Fenpropimorph	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Fluazifop-butyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-

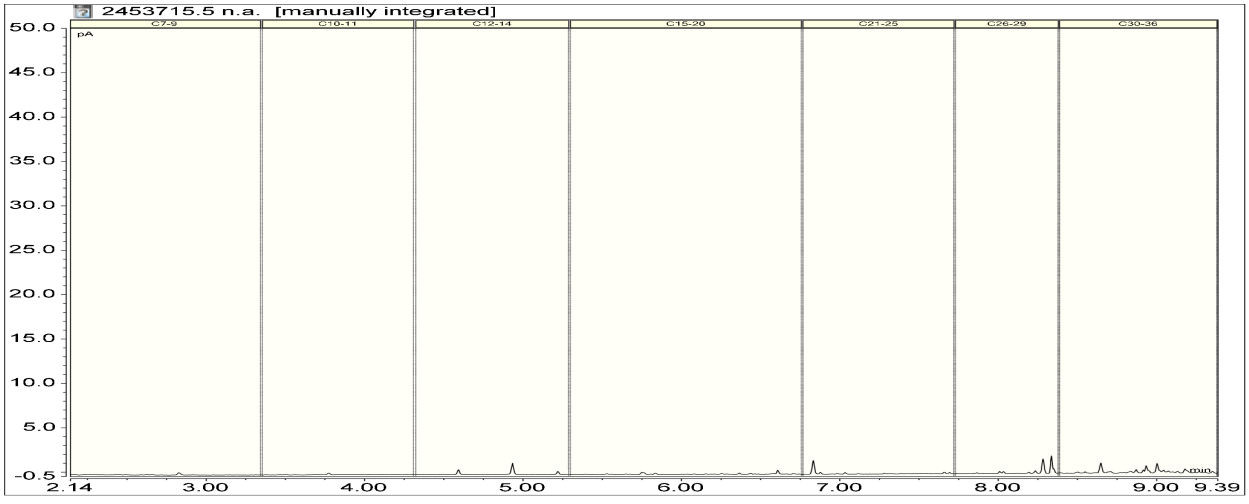
Sample Type: Soil						
Sample Name:		A7S2 12-Oct-2020	A7S3 12-Oct-2020	A7S4 12-Oct-2020	A7S5 12-Oct-2020	A8S1 12-Oct-2020
Lab Number:		2453715.31	2453715.32	2453715.33	2453715.34	2453715.35
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Fluometuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Flusilazole	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Fluvalinate	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Furalaxyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Haloxyfop-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Hexaconazole	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Hexazinone	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	< 0.3	< 0.3	< 0.3	< 0.3	-
Kresoxim-methyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Linuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Malathion	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Metalaxyl (Mefenoxam)	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Methamidophos	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Metolachlor	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Metribuzin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Molinate	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Myclobutanil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Naled	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Norflurazon	mg/kg	< 0.12	< 0.12	< 0.12	< 0.12	-
Oxadiazon	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Oxyfluorfen	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Paclobutrazol	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Parathion-ethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Parathion-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Pendimethalin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Permethrin	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Pirimicarb	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Pirimiphos-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Prochloraz	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Procymidone	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Prometryn	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Propachlor	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Propanil	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	-
Propazine	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Propiconazole	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Pyriproxyfen	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Quizalofop-ethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Simazine	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Simetryn	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Sulfentrazone	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	< 0.12	< 0.12	< 0.12	< 0.12	-
Tebuconazole	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbacil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbufos	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbumeton	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbuthylazine	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Terbuthylazine-desethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbutryn	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Thiabendazole	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Thiobencarb	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Tolylfluanid	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Triazophos	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Trifluralin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Vinclozolin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-

Sample Type: Soil						
Sample Name:		A7S2 12-Oct-2020	A7S3 12-Oct-2020	A7S4 12-Oct-2020	A7S5 12-Oct-2020	A8S1 12-Oct-2020
Lab Number:		2453715.31	2453715.32	2453715.33	2453715.34	2453715.35
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	-	154
C10 - C14	mg/kg dry wt	-	-	-	-	950
C15 - C36	mg/kg dry wt	-	-	-	-	109,000
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	-	111,000

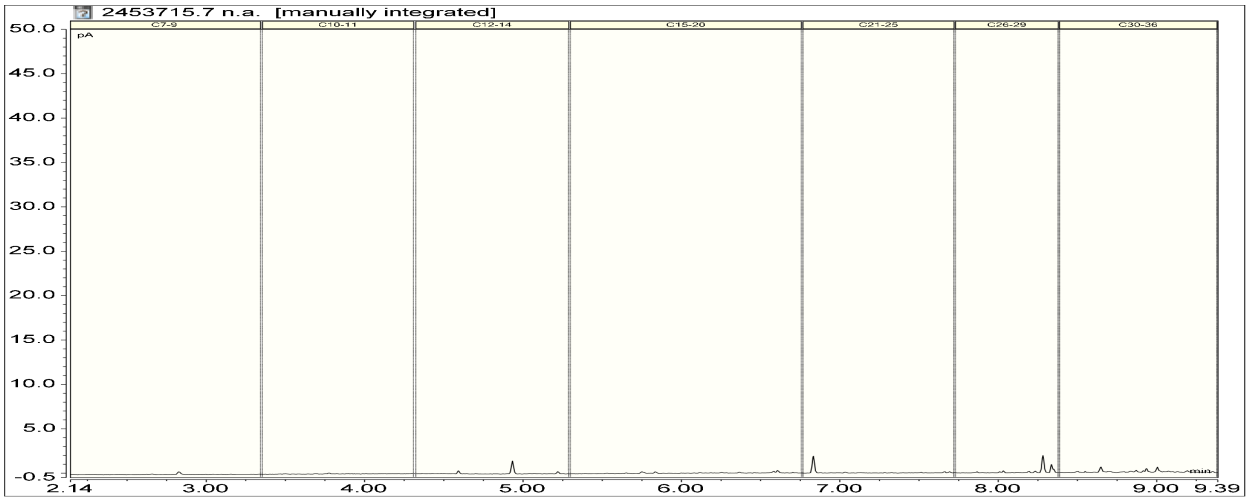
2453715.4
A3S1 12-Oct-2020
Client Chromatogram for TPH by FID



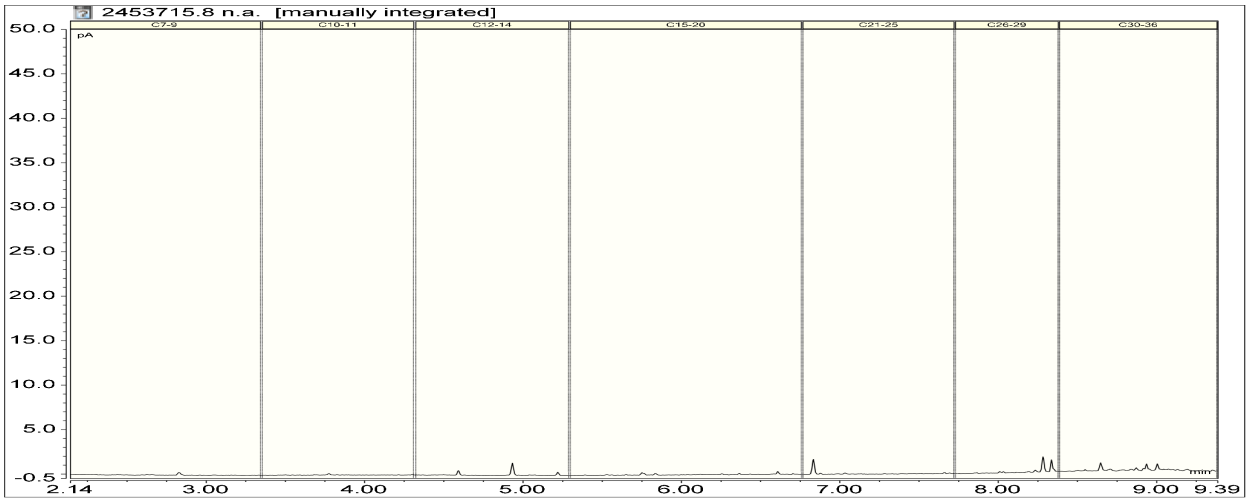
2453715.5
A3S2 12-Oct-2020
Client Chromatogram for TPH by FID



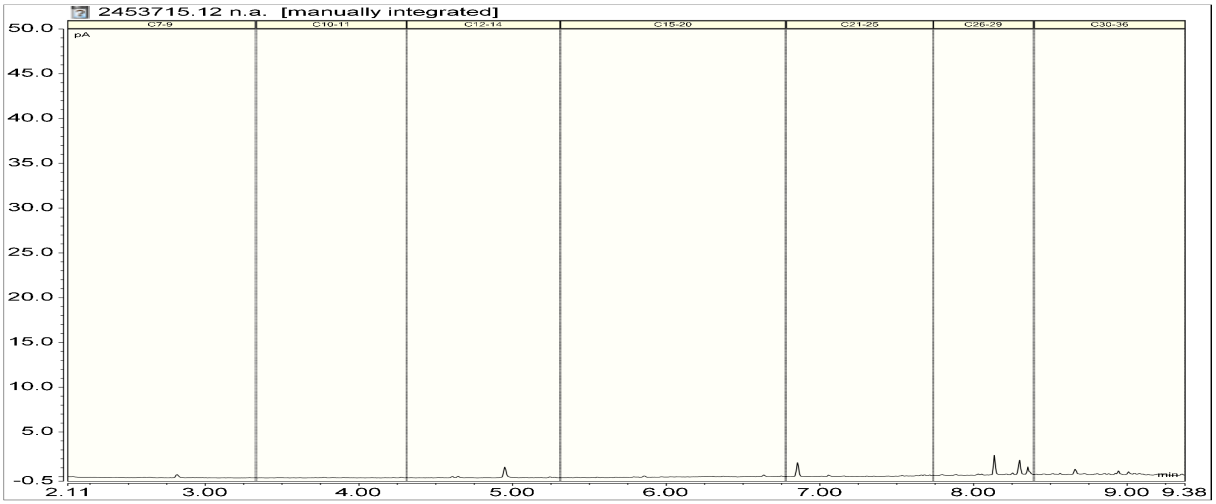
2453715.7
A3S4 12-Oct-2020
Client Chromatogram for TPH by FID



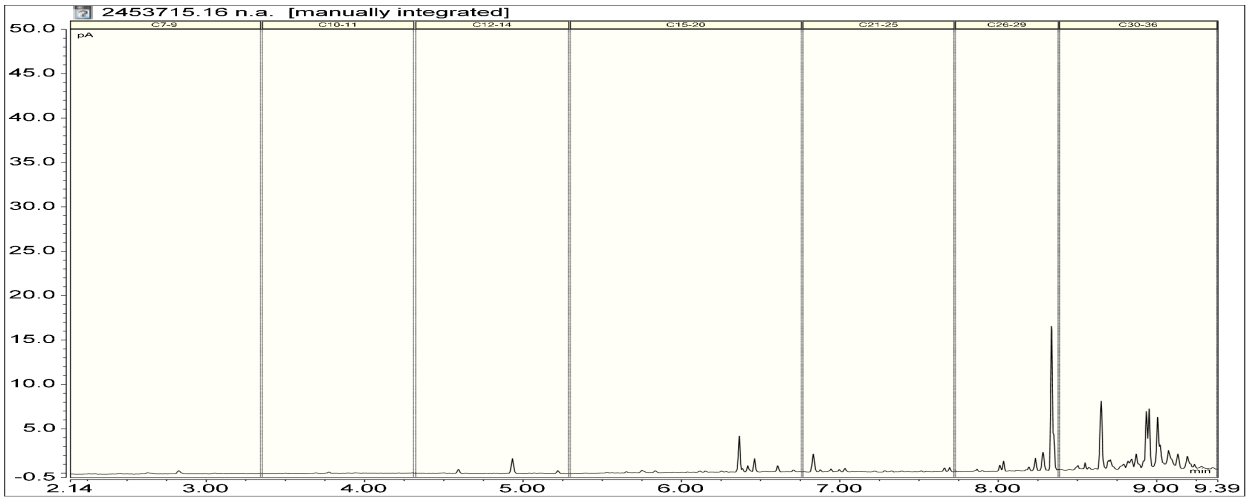
2453715.8
A3S5 12-Oct-2020
Client Chromatogram for TPH by FID



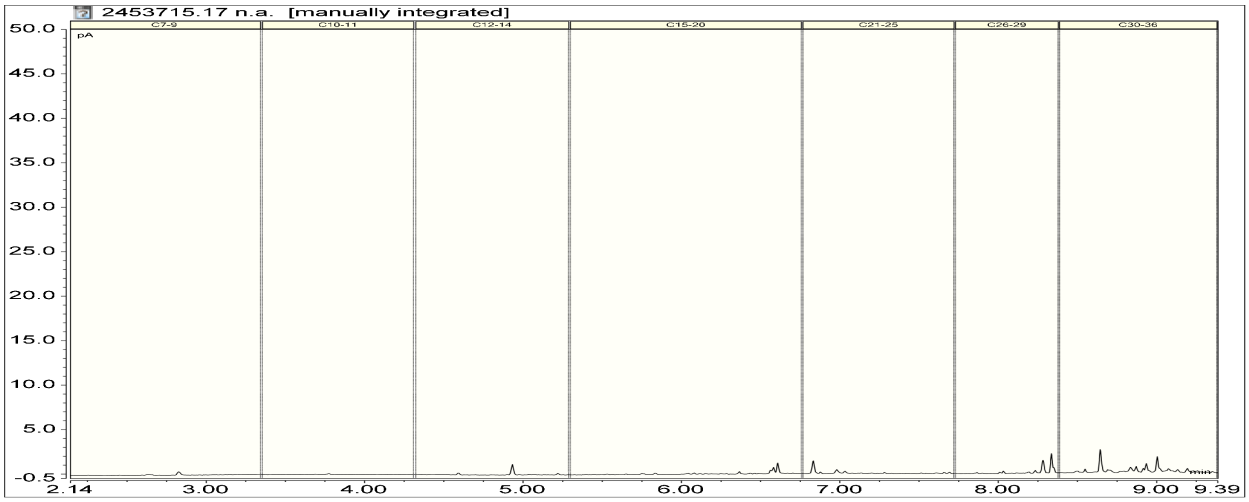
2453715.12
A3S9 12-Oct-2020
Client Chromatogram for TPH by FID



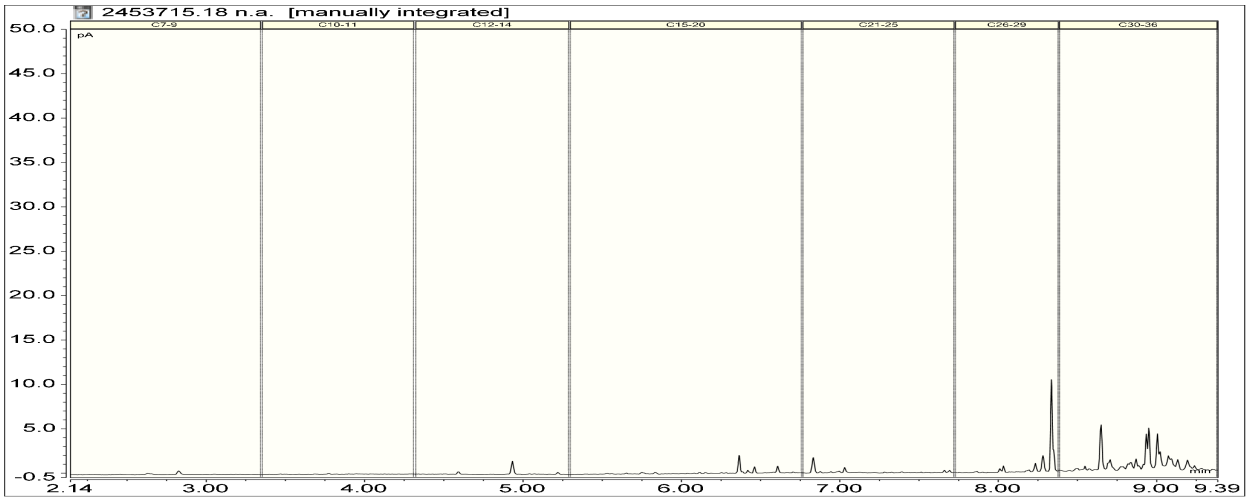
2453715.16
A4S2 12-Oct-2020
Client Chromatogram for TPH by FID



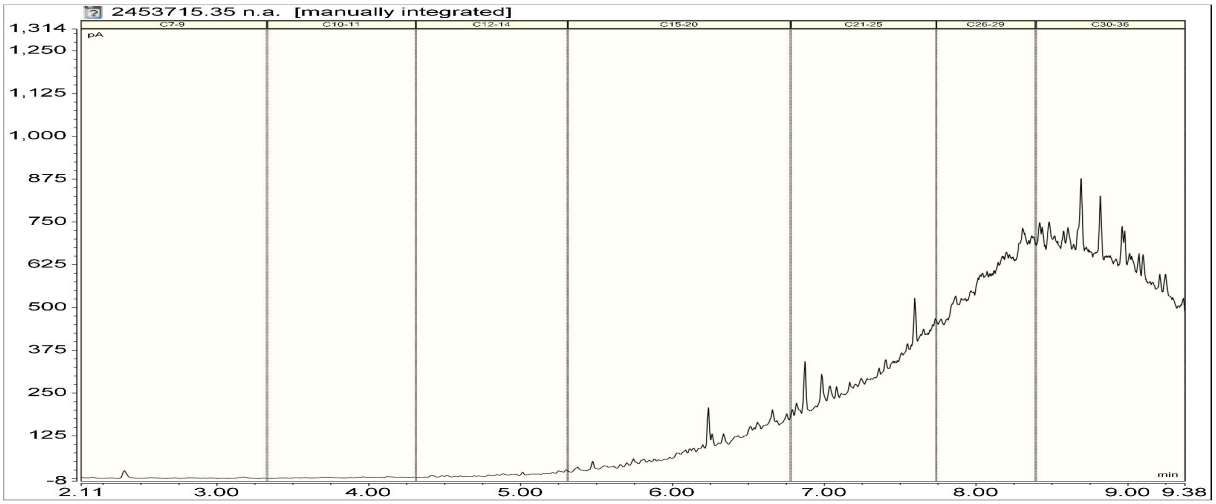
2453715.17
A4S3 12-Oct-2020
Client Chromatogram for TPH by FID



2453715.18
A4S4 12-Oct-2020
Client Chromatogram for TPH by FID



2453715.35
A8S1 12-Oct-2020
Client Chromatogram for TPH by FID



Analyst's Comments

#1 It should be noted that due to the oily nature of this sample, the analysis has been performed on a fraction that still contained a greater than normal amount of moisture. Please take this into account when interpreting the results.

It should be noted that the replicate analyses performed on this sample as part of our in-house Quality Assurance procedures showed greater variation than would normally be expected (Replicate 1 was 6.57mg/kg and replicate 2 was 5.14mg/kg). This may reflect the heterogeneity of the sample.

#2 It should be noted that due to the oily nature of this sample, the analysis has been performed on a fraction that still contained a greater than normal amount of moisture. Please take this into account when interpreting the results.

#3 It should be noted that due to the oily nature of this sample, the analysis has been performed on a fraction that still contained a greater than normal amount of moisture. Please take this into account when interpreting the results.

It should be noted that the replicate analyses performed on this sample as part of our in-house Quality Assurance procedures showed greater variation than would normally be expected (Replicate 1 was 63.4mg/kg and replicate 2 was 31.8mg/kg). This may reflect the heterogeneity of the sample.

#4 It should be noted that due to the oily nature of this sample, the analysis has been performed on a fraction that still contained a greater than normal amount of moisture. Please take this into account when interpreting the results.

#5 It should be noted that due to the oily nature of this sample, the analysis has been performed on a fraction that still contained a greater than normal amount of moisture. Please take this into account when interpreting the results.

It should be noted that the replicate analyses performed on this sample as part of our in-house Quality Assurance procedures showed greater variation than would normally be expected (Replicate 1 was 1257mg/kg and replicate 2 was 1657mg/kg). This may reflect the heterogeneity of the sample.

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			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	19-24, 30-34
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	25
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	4-25, 30-35
Macro Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	35

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	25
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	25
Heavy metals, MacroDig, screen, As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	35
Heavy Metals, Screen Level*	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-18, 25-29, 35
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	19-24, 30-34
Organochlorine/nitro&phosphorus Pest.s Screen in Soils, GCMS	Sonication extraction, GC-ECD and GC-MS analysis. In-house based on US EPA 8081 and US EPA 8270.	-	19-24, 30-34
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	25
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	4-5, 7-8, 12, 16-18, 35
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	8 mg/kg dry wt	4-18, 35
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	4-18, 35
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	4-18, 35
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	70 mg/kg dry wt	4-18, 35

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

Testing was completed between 14-Oct-2020 and 16-Oct-2020. 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

Hill Laboratories
TRIED, TESTED AND TRUSTED

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E mail@hill-labs.co.nz
W www.hill-laboratories.com

Certificate of Analysis

Client:	Engeo Limited	**Lab No:**	2455602 SPv1
Contact:	Natalie Flatman C/- Engeo Limited PO Box 373 Christchurch 8140	**Date Received:**	15-Oct-2020
		Date Reported:	19-Oct-2020
		Quote No:	107705
		Order No:	
		Client Reference:	P2020.002.259_232
		Submitted By:	Natalie Flatman

Sample Type: Soil

	Sample Name:	A9_1.1 14-Oct-2020	A9_1.2 14-Oct-2020	A9_2.1 14-Oct-2020	A9_2.2 14-Oct-2020	A9_3.1 14-Oct-2020
	Lab Number:	2455602.1	2455602.2	2455602.3	2455602.4	2455602.5
Individual Tests						
Total Recoverable Lead	mg/kg dry wt	17.7	18.9	3,400	198	31

	Sample Name:	A9_3.2 14-Oct-2020	A9_4.1 14-Oct-2020	A9_4.2 14-Oct-2020	A9_5.1 14-Oct-2020	A9_5.2 14-Oct-2020
	Lab Number:	2455602.6	2455602.7	2455602.8	2455602.9	2455602.10
Individual Tests						
Total Recoverable Lead	mg/kg dry wt	24	32	24	160	240

	Sample Name:	A9_6.1 14-Oct-2020	A9_6.2 14-Oct-2020	A9_7.1 14-Oct-2020	A9_7.2 14-Oct-2020	A9_8.1 14-Oct-2020
	Lab Number:	2455602.11	2455602.12	2455602.13	2455602.14	2455602.15
Individual Tests						
Total Recoverable Lead	mg/kg dry wt	1,910	45	350	68	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	-	6
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	-	0.37
Total Recoverable Chromium	mg/kg dry wt	-	-	-	-	24
Total Recoverable Copper	mg/kg dry wt	-	-	-	-	11
Total Recoverable Lead	mg/kg dry wt	-	-	-	-	260
Total Recoverable Nickel	mg/kg dry wt	-	-	-	-	10
Total Recoverable Zinc	mg/kg dry wt	-	-	-	-	640

	Sample Name:	A9_9.1 14-Oct-2020	A9_9.2 14-Oct-2020	A9_10.1 14-Oct-2020	A9_10.2 14-Oct-2020	
	Lab Number:	2455602.16	2455602.17	2455602.18	2455602.19	
Individual Tests						
Total Recoverable Lead	mg/kg dry wt	940	520	148	49	-

Analyst's Comments

Appendix No.1 - Chain of Custody

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%.	-	1-19

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

Sample Type: Soil			
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%.	-	1-14, 16-19
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	15
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-14, 16-19
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	1-14, 16-19

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

Testing was completed on 19-Oct-2020. 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.

Carole Rodgers-Carroll BA, NZCS
Client Services Manager - Environmental

Hill Laboratories
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ANALYSIS REQUEST

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

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E mail@hill-labs.co.nz
W www.hill-laboratories.com

Job No: **245 5602**
Date Recv: 15-Oct-20 06:09
Received by: Simon Argent
3124556028

Quote No

Primary Contact Natalie Flatman

Submitted By Natalie Flatman

Client Name ENGEO Ltd

Address 124 Montreal Street, Sydenham

Christchurch *Postcode* 8023

Phone 033289012 *Mobile* 0273350114

Email nflatman@engeo.co.nz

Charge To ENGEO Ltd

Client Reference P2020.002.259_282

Order No

Results To *Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.*

☑ *Email Primary Contact* ☐ *Email Submitter* ☐ *Email Client*

☐ *Email Other*

☐ *Other*

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories
Date & Time: 14/10/20 4:00pm
Name: N Flatman
☐ *Tick if you require COC to be emailed back*
Signature:

Received at Hill Laboratories
Date & Time:
Name:
Signature:

Condition ☐ *Room Temp* ☐ *Chilled* ☐ *Frozen* Temp: 6.4

☐ *Sample and Analysis details checked*
Signature:

ADDITIONAL INFORMATION

Priority ☐ Low ☑ Normal ☐ High
☐ **Urgent** (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	A9_1.1	14/10/20		ES	Lead
2	A9_1.2				
3	A9_2.1				
4	A9_2.2				
5	A9_3.1				
6	A9_3.2				
7	A9_4.1				
8	A9_4.2				
9	A9_5.1				
10	A9-5.2				
11	A9_6.1				
12	A9_6.2				

Continued on next page

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
13	A9_7.1	14/10/20		ES	Lead
14	A9_7.2				Lead
15	A9_8.1				Heavy metals
16	A9_9.1				Lead
17	A9_9.2				
18	A9_10.1				
19	A9_10.2				
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Terra Scientific Ltd

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

Version Number: 10 | Date Issued: August 2020 | Authorised By: JC | Controlled Document

Client Name:	ENGEO Christchurch	**Job Number:**	T003121a	**Total Samples Received:**	3
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	P2020.002.259.232	**Date Received:**	12/10/2020
Client Reference:	P2020.002.259.232			**Date Analysed:**	13/10/2020
Client Contact:	Natalie Flatman	**Analyst:**	Sarah Giles	**Date Reported:**	20/10/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T003121.1	1	A2S1 @ 0.0-0.2 mbgl, Soil											
		Layer 1: >10 mm	762.21	47.16	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		70.17	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		559.48	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		57.99	Organic Fibres								
		Total sample weight:		676.81	Total Combined:	0.00000	0.00000	0.00000					
T003121.2	2	A2S2 @ 0.0-0.2 mbgl, Soil											
		Layer 1: >10 mm	597.05	0.00	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		42.80	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		461.02	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		59.90	Organic Fibres								
		Total sample weight:		503.82	Total Combined:	0.00000	0.00000	0.00000					

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

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Client Contact:	Natalie Flatman	**Analyst:**	Sarah Giles	**Date Reported:**	20/10/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T003121.3	3	A2S3 @ 0.0-0.2 mbgl, Soil											
		Layer 1: >10 mm	731.40	16.40	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		48.85	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		570.90	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		55.54	Organic Fibres								
		Total sample weight:		636.15	Total Combined:	0.00000	0.00000	0.00000					

Note: This report has been reissued to amend all sample descriptions at the request of the client. This report supersedes T003121.

Method References and Disclaimers

Samples were analysed in: AS4964-2004 Australian Standard - Method for Qualitative Identification of Asbestos in Bulk Samples
BRANZ - New Zealand Guidelines for Assessing and Managing Asbestos in Soil 2017

Disclaimers:
Samples are reported 'As Received'. Terra Scientific takes no responsibility for sampling processes, client sample descriptions and sample locations as these were provided by the client.
The results presented in this report relate specifically to the samples submitted for this job.
The detection limit is 0.1g/1kg (0.01% w/w) as stated in the AS4964-2004. Samples that contain asbestos less than this limit are outside the scope of accreditation.
Asbestos calculations are outside the scope of accreditation.
All opinions and interpretations are outside the scope of accreditation.
This report shall not be reproduced, except in full, without the written consent of the Key Technical Person assigned to this report.

For any queries regarding this report, please do not hesitate to contact the laboratory and speak with the Key Technical Person.

Jessica Campbell
Managing Director
Key Technical Person

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

Client Name:	ENGEO Christchurch	**Job Number:**	T003145	**Total Samples Received:**	2
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	P2020.002.259_232	**Date Received:**	14/10/2020
Client Reference:	P2020.002.259_232			**Date Analysed:**	14/10/2020
Client Contact:	Natalie Flatman	**Analyst:**	Lisa Bullock	**Date Reported:**	14/10/2020

ASBESTOS ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Results	Comments
T003145.1	1	A9_1_Bulk, Cement Unpainted compressed board **Sample Weight:** 6.58 g	**Chrysotile (White Asbestos)** Organic Fibres	
T003145.2	2	A9_2_Bulk, Cement Unpainted compressed board **Sample Weight:** 41.91 g	Organic Fibres	No Asbestos Detected

Method References and Disclaimers

Samples were analysed in accordance with: AS4964-2004 Australian Standard - Method for Qualitative Identification of Asbestos in Bulk Samples

Samples are reported 'As Received'. Terra Scientific takes no responsibility for sampling processes, client sample descriptions and sample locations as these were provided by the client.

Disclaimers:
The results presented in this report relate specifically to the samples submitted for this job.
The detection limit is 0.1g/1kg as stated in the AS4964-2004.
This report shall not be reproduced, except in full, without the written consent of the Key Technical Person assigned to this report.

For any queries regarding this report, please do not hesitate to contact the laboratory and speak with the Key Technical Person.

Sarah Giles
Laboratory Analyst
Key Technical Person

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

Version Number: 10 | Date Issued: August 2020 | Authorised By: JC | Controlled Document

Client Name:	ENGEO Christchurch	**Job Number:**	T003145.2	**Total Samples Received:**	2
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	P2020.002.259_232	**Date Received:**	15/10/2020
Client Reference:	P2020.002.259_232			**Date Analysed:**	16/10/2020
Client Contact:	Natalie Flatman	**Analyst:**	Sarah Giles	**Date Reported:**	16/10/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T003145.1	1	A9 - 1.1, Soil											
		Layer 1: >10 mm	724.54	N/A	N/A	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		N/A	N/A	N/A	0.00000	0.00000					
		Layer 3: <2 mm		611.74	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		50.13									
		Total sample weight:		611.74	Total Combined:	0.00000	0.00000	0.00000					
T003145.2	2	A9 - 1.2, Soil											
		Layer 1: >10 mm	706.68	N/A	N/A	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		N/A	N/A	N/A	0.00000	0.00000					
		Layer 3: <2 mm		597.95	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		53.11									
		Total sample weight:		597.95	Total Combined:	0.00000	0.00000	0.00000					

Method References and Disclaimers

Samples were analysed in: AS4964-2004 Australian Standard - Method for Qualitative Identification of Asbestos in Bulk Samples
BRANZ - New Zealand Guidelines for Assessing and Managing Asbestos in Soil 2017

Samples are reported 'As Received'. Terra Scientific takes no responsibility for sampling processes, client sample descriptions and sample locations as these were provided by the client.
The results presented in this report relate specifically to the samples submitted for this job.

Disclaimers:
The detection limit is 0.1g/1kg (0.01% w/w) as stated in the AS4964-2004. Samples that contain asbestos less than this limit are outside the scope of accreditation.
Asbestos calculations are outside the scope of accreditation.
All opinions and interpretations are outside the scope of accreditation.

For any queries regarding this report, please do not hesitate to contact the laboratory and speak with the Key Technical Person.

Jessica Campbell
Managing Director
Key Technical Person

ENGEO

Celebrating 10 YEARS IN NZ

Combined Preliminary and Detailed Site Investigation

735 Shands Road

Prebbleton

Canterbury

Submitted to:

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ENGEO Document Control:

Report Title	Combined Preliminary and Detailed Site Investigation - 735 Shands Road, Prebbleton			
Project No.	17903.000.001	Doc ID	02	
Client	Urban Estates Limited	Client Contact	Justin McDonald	
Distribution (PDF)	Urban Estates Limited			
Date	Revision Details/Status	WP	Author	Reviewer
23/10/2020	Issued to Client	DF	HA	DR

1 Introduction

ENGEO Ltd was requested by Urban Estates Limited to undertake a combined Preliminary and Detailed Site Investigation (PSI / DSI) of the property at 735 Shands Road in Prebbleton, Canterbury (herein referred to as 'the site'). This work has been carried out in accordance with our signed agreement dated 12 October 2020 (P2020.002.259_01). The investigation area is shown in Figure 1. ENGEO understands that the site is to undergo a plan change for residential land use, with eventual residential subdivision which will likely involve soil disturbance and require information on the suitability of the site and soil quality for its proposed end use.

This PSI / DSI was completed in order to satisfy Selwyn District Council (SDC) requirements in relation to the plan change assessment and for potential future subdivision requirements in accordance with the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES).

This PSI / DSI was undertaken in general accordance with the MfE 2011 Contaminated Land Management Guidelines (CLMG) No.5: Guidelines for Site Investigation and Site Analysis of Soil and reported in general accordance with the MfE 2011 CLMG No.1: Reporting on Contaminated Sites in New Zealand.

1.1 Objective of the Assessment

The objectives of this assessment were to:

- Evaluate and identify conditions of releases and threatened releases of hazardous substances on, at, in or to the subject property;
- Evaluate the presence and extent of identified contaminants of concern (COC) at the site; and
- Assess whether the COCs pose an unacceptable risk to human health or the environment for the proposed plan change and future potential subdivision.

1.2 Approach

To satisfy the objectives, ENGEO sought to gather information regarding the following:

- Current and past property uses and occupancies;
- Current and past uses of hazardous substances;
- Waste management and disposal activities that could have caused a release or threatened release of hazardous substances;
- Current and past corrective actions and response activities to address past and ongoing releases of hazardous substances at the subject property;
- Properties adjoining or located near the subject property that have environmental conditions that could have resulted in conditions indicative of releases or threatened releases of hazardous substances to the subject property; and
- COC concentrations within the soils underlying the site.

2 Site Description and Setting

The total site area is 8.09 ha, with the legal identifier Lot 1 DP 29158. It is located at 735 Shands Road in Prebbleton. The site is currently being used for mixed residential and agricultural use. ENGEO understands that the site is to be re-zoned for future potential residential subdivision.

Site information is summarised in Table 1 with photographs of the site taken during the site walkover provided in Appendix 1.

Table 1: Site Information

Item	Description
Location	735 Shands Road, Prebbleton
Legal Description	Lot 1 DP 29158
Current Land Use	Residential areas present on all sites with agricultural grazing undertaken in the paddock areas.
Proposed Land Use	Residential
Building Construction and Use	Dwelling – Concrete ring foundation, brick cladding, cement board soffits, metal joinery and roof. Sleepout – Concrete foundation, brick cladding, metal roof. Shed north of dwelling – Timber floor, brick cladding, metal roof. Carport – Concrete foundation, metal and brick cladding, metal roof. Large barn south of dwelling – metal pole, metal cladding and roof. Stables – Concrete foundation, timber and metal cladding, metal roof. Shed southeast of dwelling – Concrete foundation, brick and timber cladding, metal roof.
Site Area	8.09 ha
Territorial Authority	Selwyn District Council
Zoning	IP – Inner Plains

The site setting is summarised in Table 2.

Table 2: Site Setting

Item	Description
Topography	The sites are predominantly flat with minor undulations. They have an elevation of approximately 27 meters above sea level.
Local Setting	The surrounding area is a mix of agricultural and lifestyle blocks with low density residential housing.
Nearest Surface Water & Use	There are two un-named land drains located along Hamptons Road and Trents Road. It is presumed that they are used for stormwater.

2.1 Geology and Hydrogeology

The documented geology and hydrogeology of the site and surrounding area is summarised in Table 3 below.

Table 3: Geological and Hydrogeological Information

Item	Description
Geology	According to GNS Science, the geology is described as Late Quaternary alluvium and colluvium; Unconsolidated to poorly consolidated mud, sand, gravel and peat of alluvial and colluvial origin.
Hydrogeology	The site is located over an unconfined / semiconfined gravel aquifer with groundwater estimated to flow in a south-easterly direction.
Groundwater Abstractions	There is one groundwater abstraction on the site: M36/5124 – CA McNoe; Irrigation CRC175633; Cairnbrae Developments Ltd; take groundwater for irrigation of up to eight hectares. There are five active groundwater abstractions located within 200 m of the site. They are used for a mix of domestic supply and irrigation.
Discharge Consents	There are no discharge consents are located on the site. There is one active discharge consent within 200 m of the site which is for the discharge of domestic sewage into ground.

3 Site History

A number of sources were used to investigate the past uses of the site. The findings of these information searches have been summarised in this section.

3.1 Listed Land Use Register

Canterbury Regional Council (CRC) maintains a Listed Land Use Register (LLUR) of past and current land uses within the Canterbury Region. The LLUR documents properties on which potentially hazardous activities have been undertaken. The potentially hazardous activities are defined on the MfE HAIL. Identifying a HAIL activity on the site triggers the requirement for a contaminated land assessment prior to development under the NES.

The CRC LLUR property statement was requested by ENGEO on 8 October 2020 for the site and is presented in Appendix 2. The following table summarises the information held on the LLUR for the site.

Table 4: Summary of the CRC LLUR Register

Period From	Period To	HAIL Activity(s)	LLUR Category
Unknown	Unknown	G5 - Waste disposal to land	Yet to be reviewed
Additional Information from LLUR Statement		INV 255742: Stockpile Characterisation at Three Intelligro Sites for CSM2 Project (this report is reviewed in Section 3.6)	

3.2 Historical Aerial Photographs

Aerial photographs obtained from Canterbury Maps from 1940 to 2019 have been reviewed. The relevant visible features are summarised in Table 5.

Table 5: Historical Aerial Photograph Review

Date	Description	Image
1940-1944	The site is being used for agricultural grazing purposes with former river channel beds observed in the historical aerial photograph. No buildings are present at the site. The surrounding land use is agricultural.	

Date	Description	Image
1955-1959	The site is use for mixed agricultural use, with a trotting track present in the northern section of the site, which also extends into the adjacent property to the east. Farm buildings are located along the southern boundary of the site. The surrounding area remains the same as the previous photograph.	
1960-1964	The southern buildings remain present on the site, with a potential animal foot drench / dip present. The trotting track is no longer visible in the photograph. An additional building is present along the western boundary of the site. The surrounding area remains the same as the previous photograph.	

Date	Description	Image
1965-1969	The site and surrounding area remain the same as the previous photograph.	
1970-1974	The farm buildings remain in the southern portion of the site, with the addition of a residential house in the south-western corner of the site. A trotting track is visible in the northern portion of the site. The surrounding area remains predominantly agricultural with some associated residential land use.	

Date	Description	Image
1980-1984	The site and surrounding area remain the same as the previous photograph.	
1985-1989	The aerial photograph is of poor resolution. The site and surrounding area remain the same as the previous photograph.	

Date	Description	Image
1990-1994	The site and surrounding area remain the same as the previous photograph.	
1995-1999	The site and surrounding area remain the same as the previous photograph.	

Date	Description	Image
2000-2004	The site and surrounding area remain the same as the previous photograph.	
2010-2015	The site and surrounding area remain the same as the previous photograph.	

3.3 Selwyn District Council Property File

The information supplied in the property file indicated that the residential house on the site was constructed in the early 1970s with additional farm buildings and sheds constructed in the mid to late 1970s. No other information that was relevant to the proposed plan change was provided in the property file.

3.4 Certificate of Title

A review of the certificate of title was completed with no information related to potential contaminating activities identified. The Certificates of Title are attached in Appendix 3.

3.5 Previous Environmental Reports

Sephira, 2020. Stockpile Characterisation at Three Intelligro Sites for CSM2 Project.

Sephira Environmental Limited (Sephira) were engaged by the Downer-McConnell Dowell Joint Venture (DMDJV) to undertake soil sampling of a number of stockpiles on land owned by Intelligro which is a landscaping supply company. The stockpiles were designed to be imported for use at the Christchurch Southern Motorway Stage 2 project. It should be noted that a number of different sites were included in this report, but this summary only provides details regarding the soil sampled at 735 Shands Road.

No specific information was made available to Sephira regarding the original source of the stockpile at 735 Shands Road, only that it was sourced from residential development projects in Halswell and Tai Tapu. Sephira anticipated that the sites in Halswell and Tai Tapu would most likely have previously been used for agricultural purposes, but due to the lack of information provided, analysed the collected soil samples for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), organochlorine pesticides (OCPs) and polycyclic aromatic hydrocarbons (PAHs).

There were two large stockpiles sampled which were approximately 750 m^3 each, and approximately 40 smaller stockpiles of 10 m^3 each. A composite sample was collected from each of the two larger stockpiles and one grab sample from all of the smaller stockpiles. Potentially asbestos containing material (PACM) and other demolition debris was noted in the larger stockpiles and one of the smaller ones. The report stated that these stockpiles appeared to be from spoils from screening soil rather than stockpiles of topsoil which were required for the motorway project. The report states that these were not included in the composite samples due to the presence of PACM and a separate sample was taken of those stockpiles. An animal hoof drench pad was also noted to be present to the north of the stockpile area. It was considered that the analytes of heavy metals and OCPs would cover the contaminants of concern associated with the animal hoof drench pad.

All of the heavy metals in the samples analysed returned concentrations below the expected background levels for the site. All PAH results were below the expected background levels for Christchurch urban soils. All OCPs were below the expected ambient levels for Canterbury regional soils. Due to the visual identification of PACM in the un-sampled stockpiles, the soils were also analysed for the presence of asbestos as a precautionary measure. No asbestos was identified.

The report concludes that soils from the stockpiles at Shands Road are suitable for use in motorway project, with the recommendation that no soil was taken from the site that contained demolition debris. Additionally, due to the presence of the animal hoof drench pad that no native site soils are taken when removing the stockpiled material.

4 Current Site Conditions

A site walkover was completed by an ENGEO representative on 13 October 2020. A summary of the walkover is provided in Table 6 below.

Table 6: Site Conditions from Walkover

Site Condition	Comments
Visible signs of contamination	Large soil stockpiles were observed in the southern section of the site. The stockpiles showed visible signs of demolition rubble including concrete and brick. One piece of PACM material was identified on the ground near one of the stockpiles. A large burn pile was identified towards the middle of the site. Evidence of burning timber, metals and greenwaste was present. Stockpiles of demolition waste was also observed near the burn piles which included timber, plasterboard, pink batts insulation, metal and ceramic tiles. Once piece of PACM cement board was identified within the waste. A smaller burn pile was observed along the southern boundary of the site to the east of the soil stockpiles. The burn pile appeared to have greenwaste and plasterboard remnants. PACM cement board debris was observed in the surface soils to the south of the large barn structure to the west of the access way from Hamptons Road. Approximately 1 m^2 of cement board was observed and was buried within the soils.
Surface water appearance	No surface water observed during the time of the walkover. The water race appeared to be clear and flowing with no sheens or suspended sediment observed.
Current surrounding land use	The surrounding land use is agricultural with associated residential housing.
Local sensitive environments	An un-named water race is present along Hamptons Road and Trents Road.
Visible signs of plant stress	There were no visible signs of plant stress observed during the time of the walkover.
Ground cover	The sites were predominantly grassed with gravel access roads.
Additional Observations (if any)	A foot drench pad was observed in the southern area of the site. Please refer to Figure 3 for this location. The shed building near the foot drench pad contained empty paint and lubricant containers. No staining was observed on the concrete floor or the surrounding soils. An area to the north of the stables was being used for stockpiling metal, old appliances, fencing and timber. The area was unable to be visually assessed below these materials but it is presumed the stockpiling is relatively recent as it is not observed in 2018 aerial photographs. Paint on the buildings to the south of the site was observed in a deteriorated state.

5 Summary of the Preliminary Site Investigation

Potential sources of contamination at the site were assessed. The information is summarised in Table 7.

Table 7: Potential Contaminants at the Site

Potential Source of Contamination	Contaminants of Concern	Possible Extent of Contamination	HAIL Activity as defined by the NES (soil)
Food Drench Pad Area 1	Heavy metals OCPs Organonitro & phosphorus pesticides (ONOPs)	Area surrounding the drench pad and possible run off area	A8: Livestock dip or spray race operations
Former Trotting Track Area 2	Heavy metals PAHs Asbestos	Former track location	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
Burn pile Area 3	Heavy metals PAHs	Burn pile and surrounding soils	G5: Waste disposal to land
Deteriorated buildings across site Area 4	Lead Asbestos	Area around sheds and buildings along southern boundary	E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition 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
Stockpiled material Area 5	Heavy metals Asbestos PAH	Area of, and in and around the stockpiles	G5: Waste disposal to land

6 Intrusive Investigation

Based on the review of the historical site uses, the COCs identified as part of this investigation were heavy metals, OCPs, ONOPs, PAHs, asbestos and lead from the foot drench pad, former trotting track, burn pile and deteriorated farm buildings.

A total of 18 samples were taken across the site, in targeted areas of concern. Soil samples were collected from each location to assess the potential risks to human health posed by the historical and current contamination sources, disposal options for soils removed during the redevelopment and for the suitability of the site for the proposed residential plan change and potential future residential subdivision. The soil sample depths and analysis at each location were determined by the site's history and on-site observations.

6.1 Field Work Methodology

The following fieldwork methodology was undertaken:

- Completion of 18 samples from targeted locations, with soil samples taken from 0.0 to 0.3 m bgl. The rationale of the samples is included in Section 8.2;
- Soil samples were taken from specific areas of concern as the potential impacts would likely have been limited to those areas. The locations would also represent areas where redevelopment workers would potentially come into contact with the material and would be representative of material to be disposed of off-site;
- All soil samples were placed in jars supplied by RJ Hill Laboratories (Hills) or Terra Analytics (Terra), dependent on the testing, which were then capped, labelled with a unique identifier and placed in chilled containers (chilly bins) prior to transportation to the laboratory. Samples were transported to Hills under standard ENGEO chain of custody documentation in Appendix 4;
- To reduce the potential for cross-contamination, each sample was collected using disposable nitrile gloves that were discarded following the collection of each sample;
- After the collection of each sample, the sampling equipment was decontaminated by washing with a solution of Decon90 and rinsing with tap water followed by deionised water;
- The intrusive samples were completed in accordance with ENGEO standard operating procedures with logging completed in general accordance with the New Zealand Geotechnical Society Inc. 'Guidelines for the Field Classification of Soil and Rock for Engineering Purposes' December 2005;
- All fieldwork and sampling was completed in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*'
- Samples were collected from the hand auger or a hand trowel at each location and inspected for visual and olfactory indicators of contamination; and

- Following receipt of the samples by Hills or Terra, the soil samples were scheduled for analysis of the identified contaminants of concern – heavy metals, asbestos, OCPs, ONOPs and PAHs.

6.2 Quality Assurance and Quality Control

The quality assurance / quality control (QA / QC) procedures employed during the works included:

- Standard sample registers and chain of custody records have been kept for all samples;
- The use of the Hills and Terra who both have certification through the International Accreditation New Zealand (IANZ). To maintain their accreditation, Hills and Terra undertake rigorous cross checking and routine duplicate sample testing to ensure the accuracy of their results.
- During the site investigation, every attempt was made to ensure that cross contamination did not occur through the use of procedures outlined within this document.

7 Regulatory Framework and Assessment Criteria

7.1 Selwyn District Council

In making any plan change application to rezone land for a new residential or business area, certain information is required to accompany the request. The requirements are set in Clause 22 of the First Schedule to the Act.

Clause 22 states:

- *A request made under Clause 21 shall be made to the appropriate local authority in writing and shall explain the purpose of, and reasons for, the proposed plan or change to a policy statement or plan and contain an evaluation report prepared in accordance with section 32 for the proposed plan or change.*
- *Where environmental effects are anticipated, the request shall describe those effects, taking into account clauses 6 and 7 of Schedule 4, in such detail as corresponds with the scale and significance of the actual and potential environmental effects anticipated from the implementation of the change, policy statement, or plan.*

This report provides an assessment of the site in regards to its suitability of the site for the proposed plan change for applicable information only.

7.2 NES

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES) came into effect on 1 January 2012 (MfE, 2011).

The NES introduced soil contaminant standards (SCSs) for 12 priority contaminants for the protection of human health under a variety of land use scenarios.

The NES requires the *Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values* be used where a NES SCS is not available. The NES does not consider environmental receptors; accordingly, the application of guidelines relevant to environmental receptors shall be implemented according to the MfE CLMG No.2 and relevant rules in the regional plan.

7.3 Disposal Criteria

An assessment of potential off-site disposal options for excess soil generated during site development works has been conducted. Dependent on the contamination conditions of the spoil, off-site disposal options range from disposal to "cleanfill" sites to managed waste sites. As outlined in the publication Waste Management Institute of New Zealand Technical Guidelines for Disposal to Land (August 2018) the definition of cleanfill states:

"Virgin excavated natural materials (VENM) such as clay, soil and rock that are free of:

- Combustible, putrescible, degradable or leachable components;
- Hazardous substances or material (such as municipal solid waste) likely to create leachate by means of biological breakdown;
- Products or materials derived from hazardous waste treatment, stabilisation or disposal practices;
- Materials such as medical and veterinary waste, asbestos or radioactive substances that may present a risk to human health if excavated;
- Contaminated soil and other contaminated materials; and
- Liquid waste."

7.4 Assessment Criteria

Contaminant concentrations in soil were compared to human health criteria based on two land uses:

- Residential land use criteria (used for future land use); and
- Commercial / Industrial land use (based on an outdoor worker scenario) (for redevelopment workers).

The land use scenarios are relevant to the likely future use of the site and are being used as a surrogate to assess short term risks to redevelopment earthworkers on-site during the development activities.

The NES methodology document notes that the exposure parameters assumed for the maintenance / excavation scenario in other New Zealand guidelines are unrealistic (perhaps by a factor of 10 or more). The technical committee preparing the NES decided that a maintenance / excavation worker scenario should not be included in the NES as sites would not be cleaned up to this standard; it was considered more appropriate that exposures to these workers be limited through the use of site-specific controls that are required under health and safety legislation. However, this report uses commercial / industrial outdoor worker criteria to get a general sense of potential risks to excavation workers during the redevelopment. Note that commercial / industrial outdoor worker criteria are based on personnel carrying out maintenance activities involving soil exposure to surface soil during landscaping activities, and occasional shallow excavation for routine underground service maintenance. Exposure to soil is less intensive than would occur during construction works but occurs over a longer period.

For a construction worker developing the site, the soil exposure is limited when compared to a large earthworks project (e.g. for a residential subdivision or industrial development). As such, the commercial / industrial outdoor worker criteria are considered suitable for obtaining a high-level understanding of potential risks to excavation workers during site redevelopment and confirming the need for site controls.

8 Results

8.1 Field Observations

A summary of the field observations is presented in Table 8 below.

Table 8: Typical Subsurface Geology

Geological Unit	Typical Depth (m bgl)	Material Description
TOPSOIL	0.0-0.35	Silty fine to medium SAND with trace gravel and rootlets; brown.
ALLUVIUM	0.35-1.3	Silty fine to medium SAND; light brown.
ALLUVIUM	1.3-2.2	Sandy fine to coarse GRAVEL with trace cobbles; brown.

Groundwater was not encountered in any of the sample locations. No visual or olfactory indicators of contamination were observed in the samples taken other than the potentially asbestos containing material (PACM) in the burn piles in Area 2, around the farm buildings in Area 4 and in the un-sampled stockpiles in Area 5.

During the site sampling visit, the current site owner stressed that they did not want ENGEO to sample the on-site stockpiles as they would be removed before the site is redeveloped.

8.2 Sample Rationale

The sample rationale is listed in Table 9 below.

Table 9: Sample Rationale

Location on site	Sample Number	HAIL Activity	Analysis
Area 1	A1S1, A1S2, A1S3, A1S4	A8	Heavy metals OCPs ONOPs
Area 2	A2S1, A2S2, A2S3, A2S4	I	Heavy metals PAHs Asbestos
Area 3	A3S1, A3S2, A3S3, A3S4	G5	Heavy metals PAHs
Area 4	A4S1, A4S2, A4S3, A4S4	E1, I	Lead Asbestos

Discussion of the Results

Soil analytical results and the adopted soil assessment criteria are presented in Table 10. Certified laboratory analysis reports are included in Appendix 4.

The analytical results can be summarised as follows:

Area 1

Lead and Dieldren were identified in the soil samples tested above the Residential guideline criteria. Lead and zinc were also identified above the expected regional background levels for the site.

Area 2

No exceedances of the guideline criteria for Residential land use or expected regional background levels were observed.

Area 3

Arsenic and lead were identified above the Residential land use criteria. Heavy metals were observed above the expected regional background levels for the site. Asbestos containing material (ACM) was also identified.

Area 4

Lead was present in the soil samples analysed above the Residential land use criteria and the expected regional background levels for the site. ACM and asbestos fibres were also identified in the samples analysed, with the asbestos fibre result above the Residential land use criteria.

Table 10: Analysis Results

Analyte	Units	A1S1	A1S2	A1S3	A1S4	A2S1	A2S2	A2S3	A2S4	A3S1	A3S2	A3S3	A3S4	A3S5	A4S1	A4S2	A4S3	A4S4	A4S5	Additional Criteria	Assessment Criteria	
																				Background (bl) - Canterbury Regional	Residential - 10% produce	Industrial
Lab Sample ID		2455187_1	2455187_2	2455187_3	2455187_4	2455187_5	2455187_6	2455187_7	2455187_8	2455187_9	2455187_10	2455187_11	2455187_12	2455187_13	2455187_14	2455187_15	2455187_16	2455187_17	2455187_18			
Soil Depth		surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface	surface			
Sample Date		13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020	13-10-2020			
Heavy Metals																						
Arsenic	mg/kg	11	5	12	6	4	4	4	5	6	**17**	5	**290**	**142**	-	-	-	-	-	**12.58**	20 (A)	70 (A)
Cadmium	mg/kg	0.12	0.11	0.11	0.11	0.1	< 0.1	< 0.1	< 0.1	0.12	0.18	0.14	**0.52**	**0.21**	-	-	-	-	-	**0.19**	3 (A)	1300 (A)
Chromium	mg/kg	14	13	13	15	13	11	12	11	15	19	15	**119**	**60**	-	-	-	-	-	**22.7**	460 (A)	6300 (A)
Copper	mg/kg	11	12	19	10	4	4	4	5	7	10	7	**149**	**175**	-	-	-	-	-	**20.3**	10000 (A)	10000 (A)
Lead	mg/kg	**270**	**133**	**260**	25	17.1	21	14.5	13.9	21	**360**	21	**440**	**85**	**1160**	**53**	**1090**	**126**	**94**	**40.96**	210 (A)	3300 (A)
Mercury	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.11**	310 (A)	4200 (A)
Nickel	mg/kg	8	8	8	11	8	8	8	7	11	11	11	11	10	-	-	-	-	-	**20.7**	400 (B)	6000 (B)
Zinc	mg/kg	**180**	**132**	**620**	65	48	48	45	50	72	**183**	70	**390**	**151**	-	-	-	-	-	**96.94**	7400 (B)	400000 (B)
Polycyclic Aromatic Hydrocarbons																						
Benzo[a]pyrene Equivalency Factor (PEF) NES	mg/kg	-	-	-	-	0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.03	< 0.03	0.17	0.03	-	-	-	-	-	-	10 (A)	35 (A)
Organochlorine Pesticides																						
Aldrin	mg/kg	< 0.011	< 0.011	< 0.011	< 0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6 (A)	160 (A)
4,4'-DDD	mg/kg	< 0.011	< 0.011	< 0.011	< 0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9 (C)	9.6 (C)
4,4'-DDE	mg/kg	< 0.011	< 0.011	< 0.011	0.036	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 (C)	9.3 (C)
4,4'-DDT	mg/kg	< 0.011	0.015	< 0.011	0.028	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.9 (C)	8.5 (C)
Total DDT Isomers	mg/kg	< 0.07	< 0.07	< 0.07	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70 (A)	1000 (A)
Dieldrin	mg/kg	0.48	0.037	4.5	< 0.011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6 (A)	160 (A)
Aldrin + dieldrin	mg/kg	< 0.491	< 0.048	< 4.511	< 0.022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.6 (A)	160 (A)

General Notes:
Cells highlighted red exceed one or more assessment criteria.
This table does not represent the full analytical results, please refer to the laboratory results for full details.
Values in bold exceed the adopted background concentrations.
bl - denotes background samples compared to Canterbury Regional -> Recent.
Assumes soil pH of 5.
Criteria for Chromium VI were conservatively selected.

Guideline Notes:
A - Methodology for Deriving Soil Guideline Values Protective of Human Health (NES, 2011), B - National Environment Protection (Assessment of Site Contamination) Measure (NEPM, 2013), C - Regional Screening Levels Targeted Hazard Quotient 1.0 (US EPA, 2020).

Table 11: Area 9 Asbestos Results

Sample Name	Sample Type	Result
A3	**Bulk – cement board**	**Chrysotile** **Amosite**
A4S6	**Bulk – cement board**	**Chrysotile** **Amosite** **Crocidolite**
A3S1	Soil	No asbestos detected
A3S2	Soil	No asbestos detected
A3S3	Soil	No asbestos detected
A3S4	Soil	No asbestos detected
A3S5	Soil	No asbestos detected
A4S6	**Soil**	**0.00961 % w/w asbestos** **Chrysotile** **Amosite**

9 Conceptual Site Model

A conceptual site model consists of four primary components. For contaminants to present a risk to human health or an environmental receptor, all four components are required to be present and connected. The four components of a conceptual site model are:

- Source of contamination;
- Pathway(s) in which contamination could potentially mobilise along (e.g. vapour or groundwater migration);
- Sensitive receptor(s) which may be exposed to the contaminants; and
- An exposure route, where the sensitive receptors and contaminants come into contact (e.g. ingestion, inhalation, dermal contact).

The potential source, pathway and receptor linkages at this subject site are provided in Table 12.

Table 12: Conceptual Site Model

Potential Sources	Potential Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk?
Foot Drench Pad	Heavy metals OCPs ONOPs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**No**, lead and dieldren present above residential guideline criteria in soil samples taken
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	
Former Trotting Track	Heavy metals PAHs	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**Yes**. No exceedances of the residential guideline criteria observed in the samples taken.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	
Burn Pile	Heavy metals PAHs Asbestos	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**No**, arsenic and lead present above residential guideline criteria in soil samples taken. ACM also present.
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	

Potential Sources	Potential Contaminants of Concern	Exposure Route and Pathways	Receptors	Acceptable Risk?
Deteriorated buildings across site	Asbestos Lead	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**No**, lead present above residential guideline criteria in soil samples taken, and asbestos identified in building material fragment and fibres in the soil
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	
Stockpiles	Heavy metals PAHs Asbestos	Dermal contact with the impacted soil, incidental ingestion and inhalation of dust during earthworks	On-site redevelopment workers Future subsurface maintenance workers	**Unknown** – no samples taken of stockpile – will require further investigation
		Dermal contact with impacted soils, incidental ingestion and inhalation of wind-blown dust	Future residential land users	
		Wind-blown dust into nearby surface waters, surface stormwater run-off or leachate through soils.	Ecological Receptors	

10 Conclusions

The information collected indicates that the site has been used for mixed purposes which includes residential land use, as a trotting track and as a farm, with these operations having the potential to impact the underlying soils. ENGEO understands that the site is to undergo a plan change assessment, with the potential for future residential subdivision. An assessment of the site for its suitability for the proposed plan change is required under the Selwyn District Council requirements. During the potential residential subdivision, soil disturbance and removal is likely to occur. ENGEO was engaged by Urban Estates Limited to complete soil testing to assess the concentrations of contaminants of concern at the site, and to provide advice regarding the suitability of the site for the proposed plan change, potential residential subdivision, the health and safety of future redevelopment workers, disposal options, and whether resource consents would be required for the future redevelopment works.

From the desktop review, the majority of the site appears to have been used for agricultural purposes, with the likelihood of the majority of the site being impacted from this land use to be low. A number of potential areas of concern were highlighted in the desktop review, and these were further investigated during the site walkover.

A previous report was reviewed as part of the work and included sampling of a number of stockpiles on-site. ENGEO did not sample these stockpiles further at the request of the site owner who also indicated they would shortly be removed from site

During the site walkover, a number of HAIL activities were observed in isolated areas of the site. The HAIL activities are associated with the former and current uses of the site as a farm and residential site, and are considered to have the potential to have impacted the underlying soils. The remainder of the site was considered highly unlikely to have been impacted by the sites former agricultural usage. The HAIL categories identified included the following:

- A8: Livestock dip or spray race operations;
- E1: Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition;
- G5: Waste disposal to land (excluding where biosolids have been used as soil conditioners); and
- 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.

A targeted intrusive investigation was undertaken to assess if the soil had been impacted by the former and current uses of the site identified during the walkover and desktop review. The investigation comprised the collection of a total of 18 soil samples from the four areas of concern at the site (see Figure 2 and 3 for reference).

The soil samples were submitted to either RJ Hill Laboratories or Terra Scientific, dependent on analysis type, to be analysed for the presence of the identified contaminants of concern. The results from the laboratory analysis indicate the following:

Area 1: Foot Drench Pad

A foot drench pad was observed during the time of the site walkover. The site owner indicated that it was no longer used. Soil samples returned lead and dieldren above the Residential land use criteria. Lead and zinc were also observed above the expected regional background levels.

Area 2: Former Trotting Track

A trotting track was observed in the historical aerial photographs but was no longer present at the site during the time of the site visit. No elevated concentrations were identified in the soil samples analysed.

Area 3: Burn Pile

A burn pile was observed during the site walkover. Arsenic and lead were identified in the soil samples taken from the pile and surrounding area above the Residential land use criteria along with heavy metals above the expected regional background levels. ACM was also identified in the material of the burn pile.

Area 4: Deteriorated Buildings

The farm buildings in the southern portion of the site were observed to be in a deteriorated condition. Soil samples were taken from soil surrounding the buildings with the soil analysis results returning concentrations of lead above residential guideline criteria. Asbestos containing material was also identified in one sample along with asbestos fibres above the residential land use criteria.

Area 5: Stockpiled Material

During the time of the soil sampling, the current site owner requested that this area was not sampled as it would be removed before the site is sold and developed. Therefore, this area remains un-investigated and will require further work at a later date to identify the potential risk to the future land users. If the stockpiles are removed by the current site owner, it is recommended that additional sampling is completed of the remaining material.

Disposal Options

As the soil analysis results were above the regional background levels for the site, material excavated from the site is unlikely to be able to be disposed of at a cleanfill facility unless soil mixing and dilution occurred. As asbestos was identified in areas of the site, the material taken from those areas would be required to be disposed of at a facility suitable of handling asbestos contaminated material.

Suitability of the Site for Future Residential Subdivision

The desk based research of the site indicated that the majority of the site is highly likely to be suitable for a residential end use as no activities included on the HAIL were identified. During a site walkover a number of potentially contaminative activities were identified and targeted soil sampling undertaken in these areas.

Based on the results taken from the foot drench pad, burn pile, and in and around the farm buildings, if future residential land users come into contact with the soil, a complete contaminant exposure pathway is likely to be present and an unacceptable risk to human health would exist. Therefore, in the site's current state, future residential subdivision is likely to be considered a restricted discretionary activity under Regulation 10 of the NES for Assessing and Managing Contaminants in Soil to Protect Human Health.

There are several options available to mitigate the risks to human health and enable the site to be subdivided and used for residential land use. The options available are:

- Excavation and removal from the site of contamination above the human health SCS for the proposed residential land use. This would likely require consent for the disturbance of the 'contaminated site' during remediation. Disposal to off-site landfills should be investigated to confirm the costs associated with this option.

- The placement of a barrier over the existing impacted areas to adequately impact exposure. This could include stabilising, capping and containing the soils exceeding the relevant SCS. If this option is chosen, it is likely that Selwyn District Council would require a long term management plan and discharge consent, and the soils should be placed in areas underneath hardstanding or an appropriate amount of soil.
- Creating an encapsulation cell in an area of the site. Again this option will likely require a number of consents including land disturbance, deposition of contaminated soils to land, and a long term management plan and discharge consent. Additional testing of the contaminated material would also likely be required for the potential leaching of the material.

In addition to the areas already investigated, it should be noted that the stockpiles are yet to be fully investigated. It is understood that this area will be investigated once the site has changed ownership.

11 Recommendations

ENGEO recommend that a remedial strategy is developed to manage the soil that exceeds the NES for residential land use in the areas of the site identified in this report. The remedial strategy should be formulated in conjunction with the final development plans, including soil removal volumes and locations, and with the District and Regional Councils, so that the most appropriate, cost effective and sustainable approach can be implemented.

Additional investigations into the previously untested areas of the site, such as the stockpiles, can be completed alongside supplementary investigations to delineate and confirm the remedial scope.

Due to the concentrations of the contaminants of concern at the site, a resource consent for land disturbance and removal is likely to be required during the site works. If a volume of soil exceeding 25 m^3 per 500 m^2 of development area is proposed to be disturbed, or if a volume of soil exceeding 5 m^3 per 500 m^3 of development area per year is proposed to be disposed of off-site, a consent should be obtained according to the requirements of the NES. Whether the work is to be undertaken under a consent or not, a site management plan is required to manage the risks to the on-site workers and the surrounding population and environment. An additional stormwater discharge consent may be required from Canterbury Regional Council for the duration of the redevelopment works on-site.

Information obtained during the investigation indicated that asbestos may be present within the buildings constructed on-site, and an asbestos survey should be carried out on the buildings to assess their condition before any demolition occurs. This will help Urban Estates to meet its obligations under the Health and Safety at Work (Asbestos) 2016 Regulations.

The conclusions and recommendations of this report are limited to the areas / depths of soil sampled. Therefore, there is the potential for unidentified hot spots of contamination to exist at the site. As previously sated, a site management plan (SMP) should outline procedures to identify and mitigate exposure to identified and unidentified contamination, if encountered during the redevelopment works.

11.1 Assessment of Environmental Effects

Based on the requirement of Section 88 of the Resource Management Act (RMA) and the framework set out in the Fourth Schedule of the RMA, the actual and potential effects associated with the proposed works are summarised in Table 13.

The environmental effects of the proposed plan change from rural residential / agricultural to residential are expected to have a no more than minor effect on the environment. Whilst elevated concentrations of concern are currently present on-site, following remediation, it is considered that the remaining site would have a less than minor impact on the receiving environment. Overall, it is considered that additional investigations and management controls may be required to address any land contamination, but that these are able to be managed through the requirements of the NESCS prior to any redevelopment works occurring and do not preclude the rezoning of the site as proposed.

Table 13: AEE from Redevelopment Works

Schedule Four Item	Assessment of Environmental Effects
Description of the proposal	The site area consisting 735 Shands Road is currently zoned as Inner Plains with the proposal designed to increase the residential density of the site.
Where the activity is likely to result in significant adverse effects, a description of the alternatives	Any actual or potential effects on the environment are likely to be less than minor. The elevated contaminants of concern at the site are not considered to be significant in relation to development works that are anticipated through the rezoning, and can be appropriately managed during redevelopment.
An assessment of the actual potential effects on the environment	Earthworks would be conducted in line with consent conditions in addition to the proposed mitigation measures detailed in the RAP. Potential for removal works to generate minor amounts of dust during the excavation and removal of impacted soil. Mitigation will involve utilising water to suppress dust and covering soil stockpiled on-site as well as all truckloads leaving the site. Potential for stormwater run-off to be contaminated if it encounters the impacted soil. Potential for noise generation from excavators. Contribution of site generated noise is unlikely to be significant and will be completed within typical working hours.
Where the activity includes the discharge of any contaminants, a description of: - Nature of the discharge - Sensitivity of the receiving environment - Alternative methods of discharge	No planned discharges. The site redevelopment will involve the removal of the identified contaminants of concern. Groundwater is not considered sensitive and therefore leaching to groundwater is likely to have a no more than minor impact.
Any effects on ecosystems, including plants or animals, physical disturbance of habitats in the vicinity	In accordance with the MfE (1999) Guidelines a Tier 1 ecological risk assessment has been conducted. No significant ecological receptors have been identified within close proximity of the site.

Schedule Four Item	Assessment of Environmental Effects
Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual or cultural, or other special values for present or future generation	No effects anticipated.
Description of the mitigation measures (safeguards and contingency plans) where relevant to be undertaken to help prevent or reduce actual or potential effect	A site management plan or remedial action plan is proposed to be issued and implemented during the redevelopment.
Where the scale or significance of the activity's effect are such that monitoring is required, a description of how, once the proposal is approved, effects will be monitored and by whom	Monitoring of site conditions and soil volumes is proposed.

12 References

ECan (2007a). *Background Concentrations of Selected Trace Elements in Canterbury Soils. Addendum 1: Additional Samples and Timaru Specific Background Levels.* Report prepared for Environment Canterbury by Tonkin & Taylor Limited, Christchurch, New Zealand. Report Number R07/1/2. Tonkin & Taylor Reference: 50875.003.

MfE (2002). *A Guide to the Management of Cleanfills*.

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MfE (2011f). *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.*

MfE (2012). *Users' guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.*

WAMINZ. (2016). *Waste Management Institute New Zealand.* Technical Guidelines for Disposal to Land.

13 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Urban Estates Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by

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Senior Engineering / Environmental Geologist

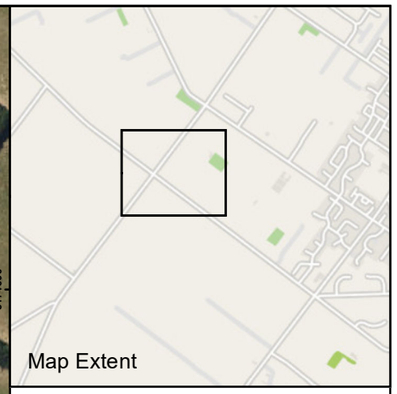
Report reviewed by

Dave Robotham, CEnvP SC

Principal Environmental Consultant

FIGURES

DATE PLOTTED: 22 October 2020 8:56:17 am BY: NFlatman



Legend

Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

0 50 100
Metres

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

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Title:
Site location plan

Client: Urban Estates		Figure No: 1
Project: 735 Shands Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:2,500	Revision: A

ORIGINAL FIGURE PRINTED IN COLOUR

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Legend

Sample location

Type

- ACM in soil
- Burn pile
- Foot drench pad
- Stockpile
- Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

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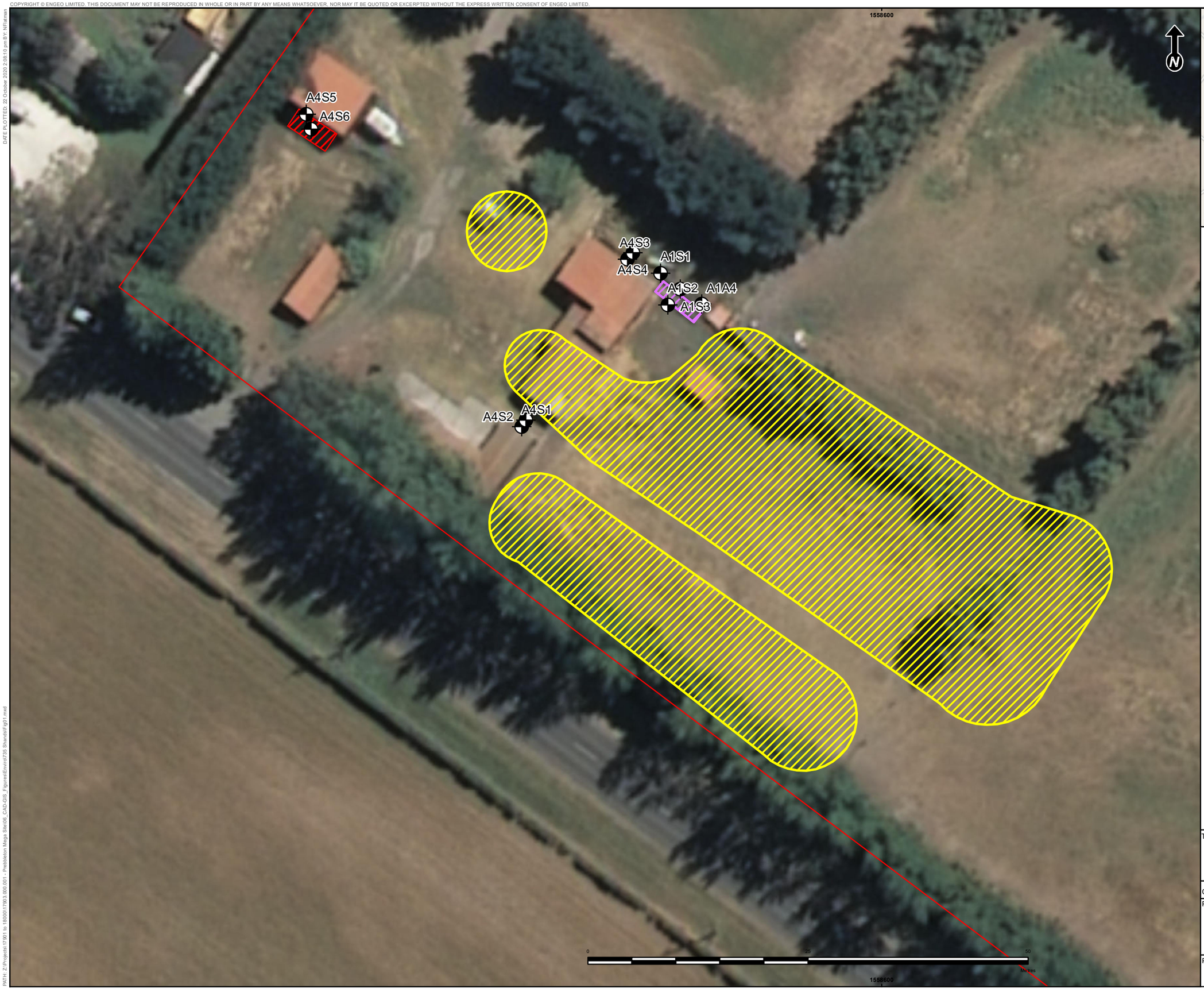
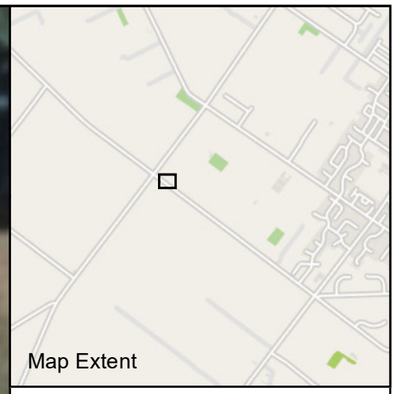
Tel: 03 328 9012, www.engeo.co.nz

Title: Sample locations

Client: Urban Estates		Figure No: 2
Project: 735 Shands Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:1,000	Revision: A

DATE PLOTTED: 22 October 2020 2:08:10 pm BY: NFlatman





Legend

Sample location

Type

- ACM in soil
- Burn pile
- Foot drench pad
- Stockpile
- Site boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

Christchurch Office
124 Montreal Street Sydenham, Christchurch 8023
Tel: 03 328 9012, www.engeo.co.nz

Title: Sample locations

Client: Urban Estates		Figure No: 3
Project: 735 Shands Road Prebbleton	Designed: NF Drawn: NF Checked: DRAFT Date: Oct 20	Size: A3
Proj No: 17903.000.000	Scale: 1:400	Revision: A

PATH: Z:\Projects\17901 to 18000\17903.000.001 - Prebbleton Mega Site\06_CAD-GIS_Figures\Enviro\735 Shands\Fig01.mxd

ORIGINAL FIGURE PRINTED IN COLOUR

APPENDIX 1:

Site Photographs

Photo 1: Dwelling at 735 Shands Road

Photo 2: Sleepout building

Photo 3: Northern paddocks

Photo 4: Barn near southern boundary

Photo 5: Stables along southern boundary line

Photo 6: Shed near southern section of the site

ENGEO
Expect Excellence

Date taken	Oct 2020	**Client**	**Urban Estates**		
Taken by	NF	**Project**	**735 Shands Road, Prebbleton**		
Approved by	DR	**Description**	**Site Photographs**		
Photo No.	1 to 6	**ENGEO Ref.**	17903	**Appendix Ref.**	1a

Photo 7: Foot drench pad in southern area of the site

Photo 8: Stockpile in southern extent of site

Photo 9: Stockpiles in southern extent of the site

Photo 10: Burn pile in middle of site

Photo 11: Demolition waste near burn piles

Photo 12: Area of ACM south of barn

ENGEO
Expect Excellence

Date taken	Oct 2020	**Client**	**Urban Estates**		
Taken by	NF	**Project**	**735 Shands Road**		
Approved by	DR	**Description**	**Site Photographs**		
Photo No.	7 to 12	**ENGEO Ref.**	17903	**Appendix Ref.**	1b

APPENDIX 2:

CRC LLUR 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

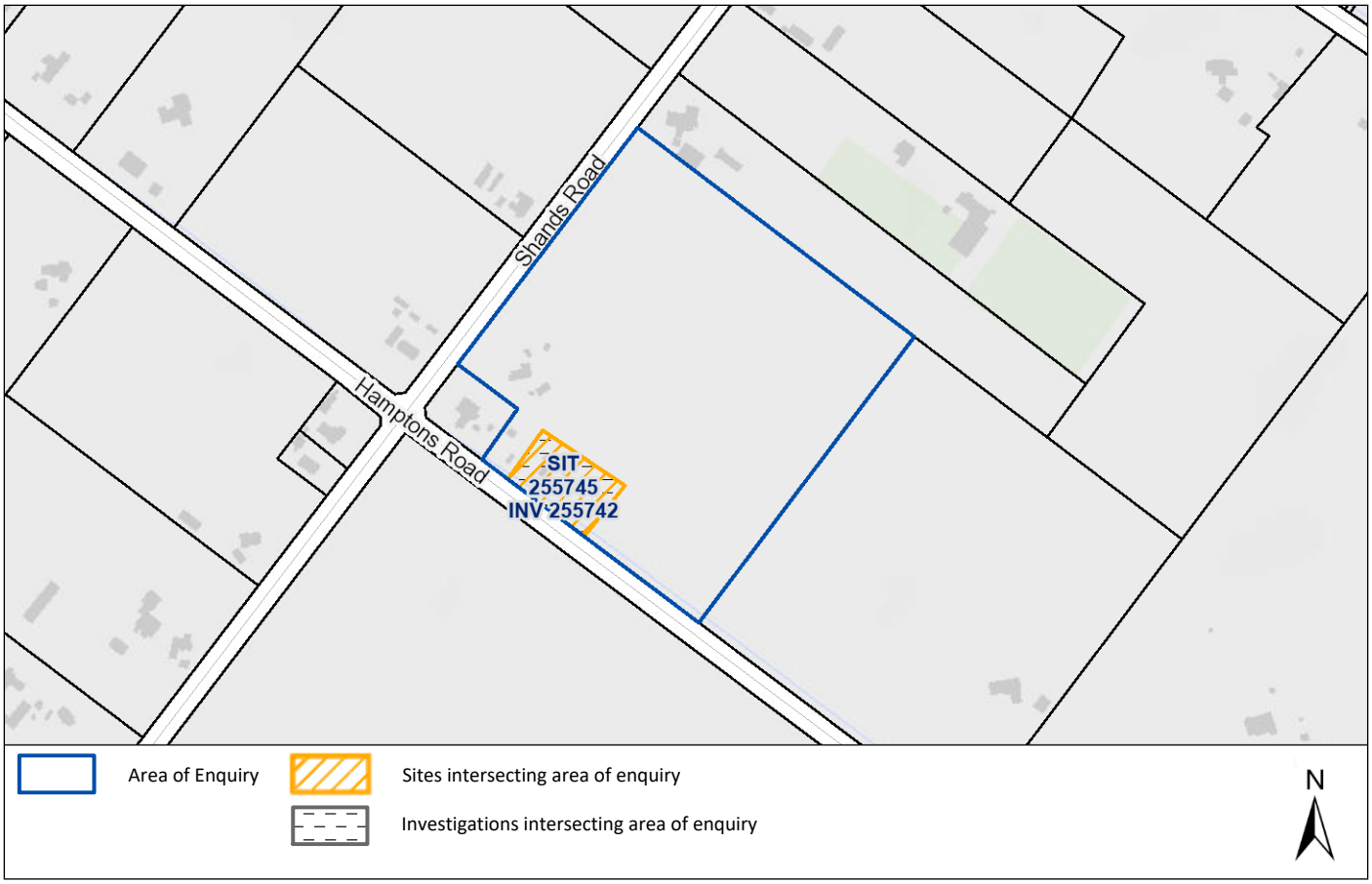
Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

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

www.ecan.govt.nz

Date:	08 October 2020
Land Parcels:	Lot 1 DP 29158 Valuation No(s): 2355200200



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
255745	Stockpiles at Three Intelligro Sites for CSM2 Project	229 to 253 Manion Road, Rolleston, 735 Shands Road, Prebbleton & 956 Springs Road, Prebbleton	G5 - Waste disposal to land;	Yet to be reviewed

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 255745: Stockpiles at Three Intelligro Sites for CSM2 Project (Intersects enquiry area.)

Site Address:	229 to 253 Manion Road, Rolleston, 735 Shands Road, Prebbleton & 956 Springs

Legal Description(s):	Road, Prebbleton Lot 1 DP 22430,Lot 1 DP 29158,Lot 2 DP 22430,Lot 3 DP 470985

Site Category:	Yet to be reviewed
Definition:	Investigation reports have been received for this site, but we have not yet reviewed them.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
		Waste disposal to land (excluding where biosolids have been used as soil conditioners)

Notes:

Investigations:

25 Feb 2020 **INV 255742: Stockpile Characterisation at Three Intelligro Sites for CSM2 Project** (Detailed Site Investigation)
Sephira Environmental Ltd

Summary of investigation(s):

Environment Canterbury has received a Detailed Site Investigation report that includes all or part of the property you have selected.

A DSI seeks to identify the type, extent and level of contamination (if any) in an area. Soil, soil-gas or water samples will have been collected and analysed.

This investigation has not been summarised.

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 ENQ265244.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Listed Land Use Register

What you need to know

Everything is connected

What is the Listed Land Use Register (LLUR)?

The LLUR is a database that Environment Canterbury uses to manage information about land that is, or has been, associated with the use, storage or disposal of hazardous substances.

Why do we need the LLUR?

Some activities and industries are hazardous and can potentially contaminate land or water. We need the LLUR to help us manage information about land which could pose a risk to your health and the environment because of its current or former land use.

Section 30 of the Resource Management Act (RMA, 1991) requires Environment Canterbury to investigate, identify and monitor contaminated land. To do this we follow national guidelines and use the LLUR to help us manage the information.

The information we collect also helps your local district or city council to fulfil its functions under the RMA. One of these is implementing the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil, which came into effect on 1 January 2012.

For information on the NES, contact your city or district council.

How does Environment Canterbury identify sites to be included on the LLUR?

We identify sites to be included on the LLUR based on a list of land uses produced by the Ministry for the Environment (MfE). This is called the Hazardous Activities and Industries List (HAIL)[1]. The HAIL has 53 different activities, and includes land uses such as fuel storage sites, orchards, timber treatment yards, landfills, sheep dips and any other activities where hazardous substances could cause land and water contamination.

We have two main ways of identifying HAIL sites:

- We are actively identifying sites in each district using historic records and aerial photographs. This project started in 2008 and is ongoing.
- We also receive information from other sources, such as environmental site investigation reports submitted to us as a requirement of the Regional Plan, and in resource consent applications.

[1] The Hazardous Activities and Industries List (HAIL) can be downloaded from MfE's website www.mfe.govt.nz, keyword search HAIL

How does Environment Canterbury classify sites on the LLUR?

Where we have identified a HAIL land use, we review all the available information, which may include investigation reports if we have them. We then assign the site a category on the LLUR. The category is intended to best describe what we know about the land use and potential contamination at the site and is signed off by a senior staff member.

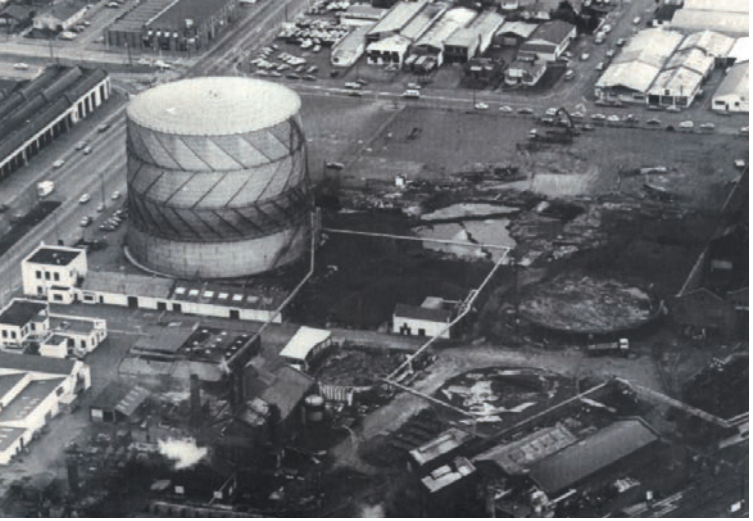
Please refer to the Site Categories and Definitions factsheet for further information.

What does Environment Canterbury do with the information on the LLUR?

The LLUR is available online at www.llur.ecan.govt.nz. We mainly receive enquiries from potential property buyers and environmental consultants or engineers working on sites. An inquirer would typically receive a summary of any information we hold, including the category assigned to the site and a list of any investigation reports.

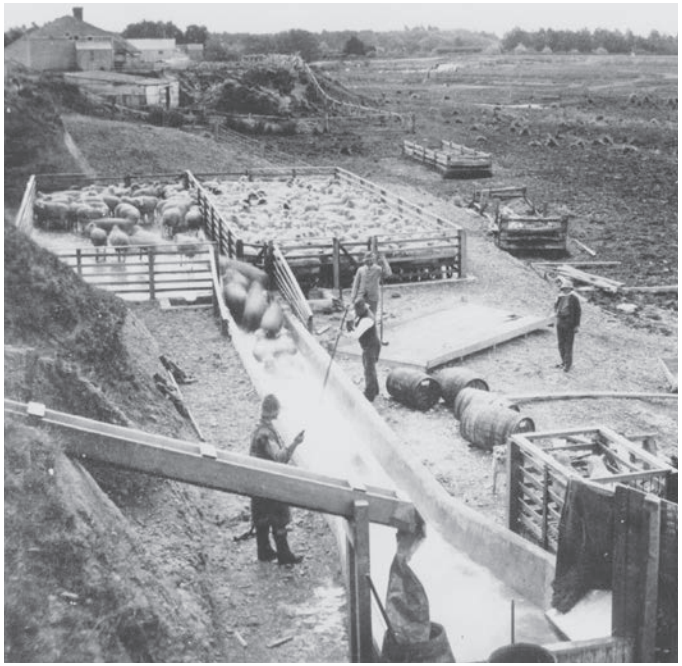
We may also use the information to prioritise sites for further investigation, remediation and management, to aid with planning, and to help assess resource consent applications. These are some of our other responsibilities under the RMA.

If you are conducting an environmental investigation or removing an underground storage tank at your property, you will need to comply with the rules in the Regional Plan and send us a copy of the report. This means we can keep our records accurate and up-to-date, and we can assign your property an appropriate category on the LLUR. To find out more, visit www.ecan.govt.nz/HAIL.



IMPORTANT!

The LLUR is an online database which we are continually updating. A property may not currently be registered on the LLUR, but this does not necessarily mean that it hasn't had a HAIL use in the past.



Sheep dipping (ABOVE) and gas works (TOP) are among the former land uses that have been identified as potentially hazardous. (Photo above by Wheeler & Son in 1987, courtesy of Canterbury Museum.)

My land is on the LLUR – what should I do now?

IMPORTANT! Just because your property has a land use that is deemed hazardous or is on the LLUR, it doesn't necessarily mean it's contaminated. The only way to know if land is contaminated is by carrying out a detailed site investigation, which involves collecting and testing soil samples.

You do not need to do anything if your land is on the LLUR and you have no plans to alter it in any way. It is important that you let a tenant or buyer know your land is on the Listed Land Use Register if you intend to rent or sell your property. If you are not sure what you need to tell the other party, you should seek legal advice.

You may choose to have your property further investigated for your own peace of mind, or because you want to do one of the activities covered by the National Environmental Standard for Assessing and Managing Contaminants in Soil. Your district or city council will provide further information.

If you wish to engage a suitably qualified experienced practitioner to undertake a detailed site investigation, there are criteria for choosing a practitioner on www.ecan.govt.nz/HAIL.

I think my site category is incorrect – how can I change it?

If you have an environmental investigation undertaken at your site, you must send us the report and we will review the LLUR category based on the information you provide. Similarly, if you have information that clearly shows your site has not been associated with HAIL activities (eg. a preliminary site investigation), or if other HAIL activities have occurred which we have not listed, we need to know about it so that our records are accurate.

If we have incorrectly identified that a HAIL activity has occurred at a site, it will be not be removed from the LLUR but categorised as Verified Non-HAIL. This helps us to ensure that the same site is not re-identified in the future.

Contact us

Property owners have the right to look at all the information Environment Canterbury holds about their properties.

It is free to check the information on the LLUR, online at www.llur.ecan.govt.nz.

If you don't have access to the internet, you can enquire about a specific site by phoning us on (03) 353 9007 or toll free on 0800 EC INFO (32 4636) during business hours.

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:
Calling from Christchurch: (03) 353 9007
Calling from any other area: 0800 EC INFO (32 4636)

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz E13/101

Listed Land Use Register

Site categories and definitions

When Environment Canterbury identifies a Hazardous Activities and Industries List (HAIL) land use, we review the available information and assign the site a category on the Listed Land Use Register. The category is intended to best describe what we know about the land use.

If a site is categorised as **Unverified** it means it has been reported or identified as one that appears on the HAIL, but the land use has not been confirmed with the property owner.

If the land use has been confirmed but analytical information from the collection of samples is not available, and the presence or absence of contamination has therefore not been determined, the site is registered as:

Not investigated:

- A site whose past or present use has been reported and verified as one that appears on the HAIL.
- The site has not been investigated, which might typically include sampling and analysis of site soil, water and/or ambient air, and assessment of the associated analytical data.
- There is insufficient information to characterise any risks to human health or the environment from those activities undertaken on the site. Contamination may have occurred, but should not be assumed to have occurred.

If analytical information from the collection of samples is available, the site can be registered in one of six ways:

At or below background concentrations:

The site has been investigated or remediated. The investigation or post remediation validation results confirm there are no hazardous substances above local background concentrations other than those that occur naturally in the area. The investigation or validation sampling has been sufficiently detailed to characterise the site.

Below guideline values for:

The site has been investigated. Results show that there are hazardous substances present at the site but indicate that any adverse effects or risks to people and/or the environment are considered to be so low as to be acceptable. The site may have been remediated to reduce contamination to this level, and samples taken after remediation confirm this.

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Managed for:

The site has been investigated. Results show that there are hazardous substances present at the site in concentrations that have the potential to cause adverse effects or risks to people and/or the environment. However, those risks are considered managed because:

- the nature of the use of the site prevents human and/or ecological exposure to the risks; and/or
- the land has been altered in some way and/or restrictions have been placed on the way it is used which prevent human and/or ecological exposure to the risks.

Partially investigated:

The site has been partially investigated. Results:

- demonstrate there are hazardous substances present at the site; however, there is insufficient information to quantify any adverse effects or risks to people or the environment; or
- do not adequately verify the presence or absence of contamination associated with all HAIL activities that are and/or have been undertaken on the site.

Significant adverse environmental effects:

The site has been investigated. Results show that sediment, groundwater or surface water contains hazardous substances that:

- have significant adverse effects on the environment; or
- are reasonably likely to have significant adverse effects on the environment.

Contaminated:

The site has been investigated. Results show that the land has a hazardous substance in or on it that:

- has significant adverse effects on human health and/or the environment; and/or
- is reasonably likely to have significant adverse effects on human health and/or the environment.

If a site has been included incorrectly on the Listed Land Use Register as having a HAIL, it will not be removed but will be registered as:

Verified non-HAIL:

Information shows that this site has never been associated with any of the specific activities or industries on the HAIL.

Please contact Environment Canterbury for further information:

(03) 353 9007 or toll free
on 0800 EC INFO (32 4636)
email ecinfo@ecan.govt.nz

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

E13/102

APPENDIX 3:

Certificate of Titles

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

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

Identifier **CB11A/908**

Land Registration District **Canterbury**

Date Issued 12 October 1971

Prior References
CB7A/116

Estate Fee Simple

Area 8.0887 hectares more or less

Legal Description Lot 1 Deposited Plan 29158

Original Registered Owners
French Bakery Limited

Interests

A393571.2 Mortgage to AMP/ERGO Mortgage and Savings Limited - 4.3.1999 at 12.35 pm

5028331.1 Transfer of Mortgage A393571.2 to AMP Bank Limited - 12.3.2001 at 9:00 am

5080669.1 Discharge of Mortgage A393571.2 - 7.9.2001 at 2:00 pm

5080669.2 Transfer to Charles Alexander McNoe - 7.9.2001 at 2:00 pm

10137360.1 Mortgage to Westpac New Zealand Limited - 31.7.2015 at 11:49 am

10686279.1 Discharge of Mortgage 10137360.1 - 30.3.2017 at 2:39 pm

10686279.2 Transfer to Cairnbrae Developments Limited - 30.3.2017 at 2:39 pm

References
Prior C/T. 7A/116

Transfer No.
N/C. Order No. 845742

Land and Deeds 69

No. 11A/903

REGISTER

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 12th day of October one thousand nine hundred and seventy-one under the seal of the District Land Registrar of the Land Registration District of Canterbury

WITNESSETH that ALFRED ERNEST WHITE of Christchurch, farmer ———

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 19 acres 3 roods 38 perches or thereabouts situated in Block XIII of the Christchurch Survey District being Lot 1 on Deposited Plan 29158, part of Rural Sections 4743 and 4793 ———

DISTRICT LAND REGISTRAR CANTERBURY, N.Z.

Assistant Land Registrar

Transfer 850849 to Edward James Donnithorne of Christchurch, Company Director - 30.11.1971 at 2.40 p.m.

A.L.R.

Mortgage 850850 to Alfred Ernest White - 30.11.1971 at 2.40 p.m.

A.L.R.

Mortgage 881782 to The New Zealand Investment Mortgage and Deposit Company Limited - 20/9/1972 at 2.37 p.m

A.L.R.

No.881783 Settled under the Joint Family Homes Act 1964 onEdward James Donnithorne abovenamed and Doris Girvan Donnithorne his wife - 20/9/1972 at 2.37 p.m

A.L.R.

Transmission 12391/1 of Mortgage 850850 to Sadie May White as Executor - 15.10.1974 at 11.49 a.m.

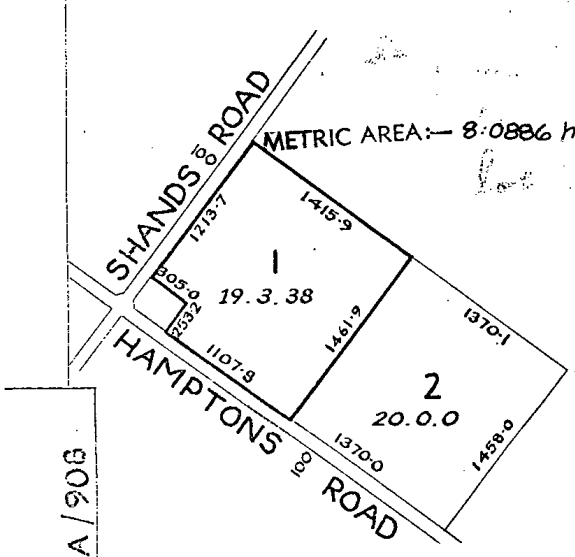
A.L.R.

Transfer 27758/1 of Mortgage 850580 to Sadie May White - 7.3.1975 at 10.49 a.m.

A.L.R.

Mortgage 157003/2 to [illegible] Limited - 23.11.1976 at 12.00 p.m.

A.L.R.



No. 11A/903

OVER

Register copy for L. & D. 69, 71, 72

Transmission 425806/1 to Doris Girvan Donnithorne, above-named, now a Widow as Survivor - 21-3-1983 at 9.06a.m.

for A.L.R.

Transmission 797750/1 to Allan Edwin George Elsom, Company Director and Alan Kendrick Archer, Solicitor, both of Christchurch as Executors - 10.4.1989 at 9.01am

for A.L.R.

Transfer 797750/2 to Laraine Beatrice Georgeson of Dunedin, Married Woman - 10.4.1989 at 9.01am

for A.L.R.

Mortgage 797750/3 to Trust Bank Canterbury Limited - 10.4.1989 at 9.01am

DISCHARGED 19/12/90 A.L.R.

for A.L.R.

Mortgage 797750/4 to Colin James Harvey - 10.4.1989 at 9.01am

DISCHARGED 24/8/1989 A.L.R.

for A.L.R.

Mortgage 823343/2 to Finance and Discounts Limited - 24.8.1989 at 11.05am

DISCHARGED 19/12/90 A.L.R.

for A.L.R.

Transfer 913447/3 to Philip James Donnithorne of Christchurch, Manager and Louise Carolyn Donnithorne his wife - 19.12.1990 at 9.52am

for A.L.R.

Mortgage 913447/4 to Trust Bank Canterbury Limited - 19.12.1990 at 9.52am

DISCHARGED 19 OCT 1993 A.L.R.

for A.L.R.

Variation of Mortgage 913447/4 - 24.2.1992 at 10.15am

A.L.R.

Transfer A76221/2 to French Bakery Limited at Christchurch - 14.10.1993 at 11.40am

for A.L.R.

Mortgage A76221/3 to ANZ Banking Group (New Zealand) Limited - 14.10.1993 at 11.40am

DISCHARGED 4.3.1999 RGL

for A.L.R.

A393571.2 Mortgage to AMP/ERGO Mortgage and Savings Limited - 4.3.1999 at 12.35

for RGL

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Search Copy

R.W. Muir
Registrar-General
of Land

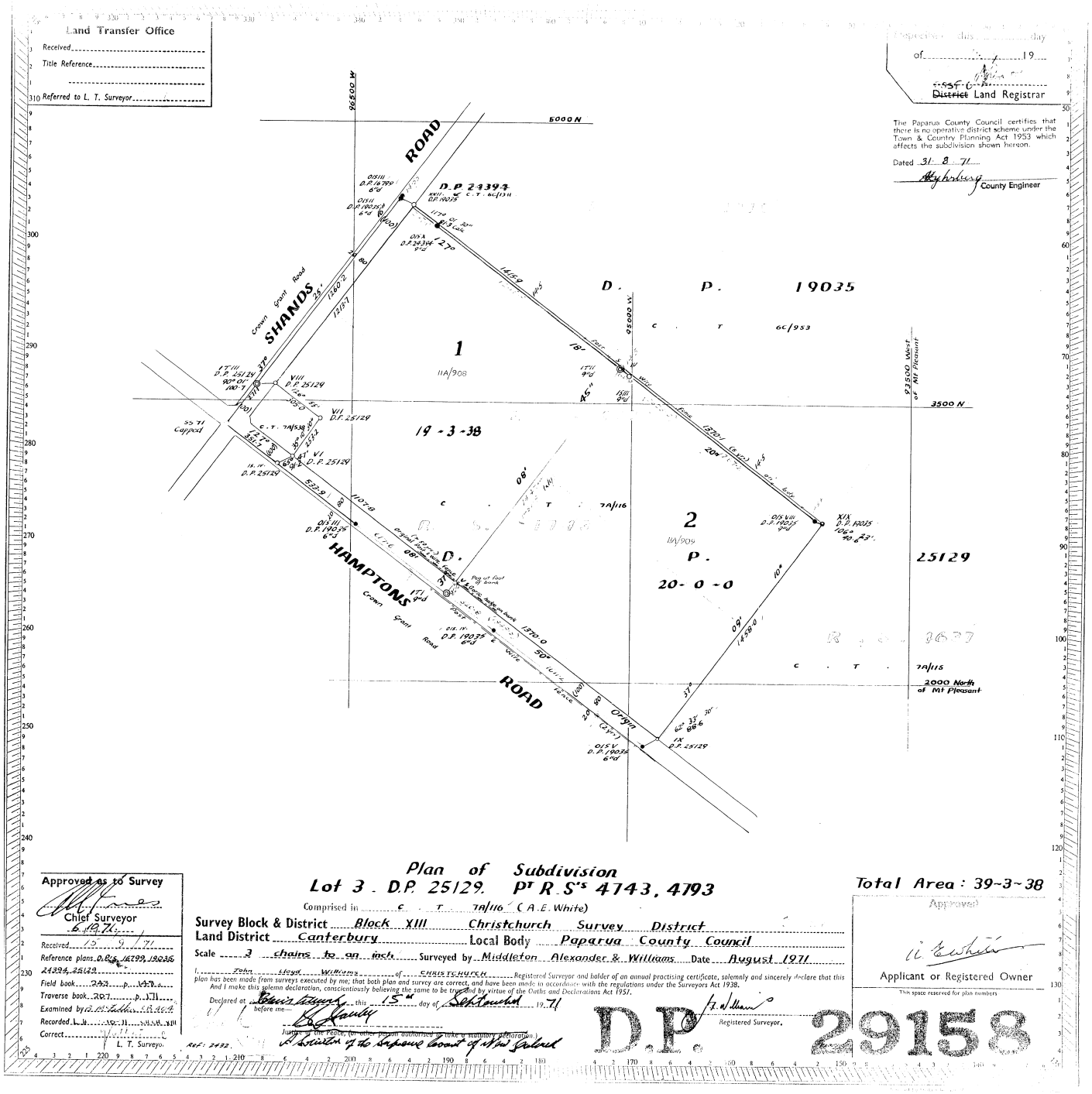
Identifier	**CB11A/908**
Land Registration District	**Canterbury**
Date Issued	12 October 1971

Prior References
CB7A/116

Estate	Fee Simple
Area	8.0887 hectares more or less
Legal Description	Lot 1 Deposited Plan 29158
Registered Owners	

Cairnbrae Developments Limited

Interests


Land Transfer Office
Received
Title Reference
Referred to L. T. Surveyor
Registered this day of 19
District Land Registrar
The Paparua County Council certifies that there is no operative district scheme under the Town & Country Planning Act 1953 which affects the subdivision shown hereon.
Dated 31 8 71
County Engineer
ROAD
SHANDS
Crown Grant Road
HAMPTONS
Crown Grant Road
ROAD
D.P 24394
D. P. 19035
C. T. 6C/953
1
IIA/908
19-3-38
2
IIA/909
P. 25129
20-0-0
C. T. 7A/116
C. T. 7A/115
5000 N
3500 N
95500 W
92500 West of Mt Pleasant
2000 North of Mt Pleasant
Plan of Subdivision
Lot 3 D.P. 25129. Pt R.S's 4743, 4793
Total Area: 39-3-38
Comprised in C. T. 7A/116 (A.E. White)
Survey Block & District Block XIII Christchurch Survey District
Land District Canterbury Local Body Paparua County Council
Scale 3 chains to an inch Surveyed by Middleton Alexander & Williams Date August 1971
Approved as to Survey
Chief Surveyor
6.10.71
Received 13 9 71
Reference plans D.P.s 16799, 19035, 24394, 25129
Field book 243 p. 120
Traverse book 207 p. 171
Examined by
Recorded
Correct
L. T. Surveyor
Ref: 2432
Approved
Applicant or Registered Owner
This space reserved for plan numbers
D.P. 29158

APPENDIX 4:

Laboratory Certificates

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:	Engeo Limited	**Lab No:**	2455187	SPv1
Contact:	Natalie Flatman	**Date Received:**	14-Oct-2020	
	C/- Engeo Limited	**Date Reported:**	16-Oct-2020	
	PO Box 373	**Quote No:**	107705	
	Christchurch 8140	**Order No:**		
		Client Reference:	P2020.002.259_735	
		Submitted By:	Natalie Flatman	

Sample Type: Soil

Sample Name:		A1S1 13-Oct-2020	A1S2 13-Oct-2020	A1S3 13-Oct-2020	A1S4 13-Oct-2020	A2S1 13-Oct-2020
Lab Number:		2455187.1	2455187.2	2455187.3	2455187.4	2455187.5
Individual Tests						
Dry Matter	g/100g as rcvd	94	92	90	93	85
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	-	4
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	-	0.10
Total Recoverable Chromium	mg/kg dry wt	-	-	-	-	13
Total Recoverable Copper	mg/kg dry wt	-	-	-	-	4
Total Recoverable Lead	mg/kg dry wt	-	-	-	-	17.1
Total Recoverable Nickel	mg/kg dry wt	-	-	-	-	8
Total Recoverable Zinc	mg/kg dry wt	-	-	-	-	48
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	11	5	12	6	-
Total Recoverable Cadmium	mg/kg dry wt	0.12	0.11	0.11	0.11	-
Total Recoverable Chromium	mg/kg dry wt	14	13	13	15	-
Total Recoverable Copper	mg/kg dry wt	11	12	19	10	-
Total Recoverable Lead	mg/kg dry wt	270	133	260	25	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	-
Total Recoverable Nickel	mg/kg dry wt	8	8	8	11	-
Total Recoverable Zinc	mg/kg dry wt	180	132	620	65	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
alpha-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
beta-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
delta-BHC	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
cis-Chlordane	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
trans-Chlordane	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
2,4'-DDD	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
4,4'-DDD	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
2,4'-DDE	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
4,4'-DDE	mg/kg dry wt	< 0.011	< 0.011	< 0.011	0.036	-
2,4'-DDT	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
4,4'-DDT	mg/kg dry wt	< 0.011	0.015	< 0.011	0.028	-
Total DDT Isomers	mg/kg dry wt	< 0.07	< 0.07	< 0.07	0.06	-
Dieldrin	mg/kg dry wt	0.48	0.037	4.5	< 0.011	-
Endosulfan I	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endosulfan II	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endosulfan sulphate	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-

Sample Type: Soil						
Sample Name:		A1S1 13-Oct-2020	A1S2 13-Oct-2020	A1S3 13-Oct-2020	A1S4 13-Oct-2020	A2S1 13-Oct-2020
Lab Number:		2455187.1	2455187.2	2455187.3	2455187.4	2455187.5
Organochlorine Pesticides Screening in Soil						
Endrin	mg/kg dry wt	< 0.011	< 0.011	0.052	< 0.011	-
Endrin aldehyde	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Endrin ketone	mg/kg dry wt	< 0.011	< 0.011	0.031	< 0.011	-
Heptachlor	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Heptachlor epoxide	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Hexachlorobenzene	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Methoxychlor	mg/kg dry wt	< 0.011	< 0.011	< 0.011	< 0.011	-
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Acetochlor	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Alachlor	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Atrazine	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Atrazine-desethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Atrazine-desisopropyl	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Azaconazole	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Azinphos-methyl	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Benalaxyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Bitertanol	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Bromacil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Bromopropylate	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Butachlor	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Captan	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Carbaryl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Carbofuran	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorfluazuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorothalonil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorpyrifos	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlorpyrifos-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Chlortoluron	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Cyanazine	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Cyfluthrin	mg/kg	< 0.07	< 0.07	< 0.07	< 0.07	-
Cyhalothrin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Cypermethrin	mg/kg	< 0.13	< 0.13	< 0.13	< 0.13	-
Deltamethrin (including Tralomethrin)	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Diazinon	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Dichlofluanid	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Dichloran	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	-
Dichlorvos	mg/kg	< 0.09	< 0.09	< 0.09	< 0.09	-
Difenoconazole	mg/kg	< 0.09	< 0.09	< 0.09	< 0.09	-
Dimethoate	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Diphenylamine	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Diuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Fenpropimorph	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Fluazifop-butyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Fluometuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Flusilazole	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Fluvalinate	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Furalaxyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Haloxyfop-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Hexaconazole	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Hexazinone	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
IPBC (3-Iodo-2-propynyl-n-butylcarbamate)	mg/kg dry wt	< 0.3	< 0.3	< 0.3	< 0.3	-
Kresoxim-methyl	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Linuron	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Malathion	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-

Sample Type: Soil						
Sample Name:		A1S1 13-Oct-2020	A1S2 13-Oct-2020	A1S3 13-Oct-2020	A1S4 13-Oct-2020	A2S1 13-Oct-2020
Lab Number:		2455187.1	2455187.2	2455187.3	2455187.4	2455187.5
Organonitro&phosphorus Pesticides Screen in Soil by GCMS						
Metalaxyl (Mefenoxam)	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Methamidophos	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Metolachlor	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Metribuzin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Molinate	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Myclobutanil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Naled	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Norflurazon	mg/kg	< 0.11	< 0.11	< 0.11	< 0.11	-
Oxadiazon	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Oxyfluorfen	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Paclobutrazol	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Parathion-ethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Parathion-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Pendimethalin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Permethrin	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Pirimicarb	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Pirimiphos-methyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Prochloraz	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Procymidone	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Prometryn	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Propachlor	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Propanil	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	-
Propazine	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Propiconazole	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	-
Pyriproxyfen	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Quizalofop-ethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Simazine	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Simetryn	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Sulfentrazone	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
TCMTB [2-(thiocyanomethylthio) benzothiazole,Busan]	mg/kg dry wt	< 0.11	< 0.11	< 0.11	< 0.11	-
Tebuconazole	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbacil	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbufos	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbumeton	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbuthylazine	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Terbuthylazine-desethyl	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Terbutryn	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Thiabendazole	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	-
Thiobencarb	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Tolylfluanid	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	-
Triazophos	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Trifluralin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Vinclozolin	mg/kg	< 0.06	< 0.06	< 0.06	< 0.06	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	-	< 0.3
1-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.012
2-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.012
Acenaphthylene	mg/kg dry wt	-	-	-	-	< 0.012
Acenaphthene	mg/kg dry wt	-	-	-	-	< 0.012
Anthracene	mg/kg dry wt	-	-	-	-	< 0.012
Benzo[a]anthracene	mg/kg dry wt	-	-	-	-	0.016
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	-	0.023
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	0.03

Sample Type: Soil						
Sample Name:		A1S1 13-Oct-2020	A1S2 13-Oct-2020	A1S3 13-Oct-2020	A1S4 13-Oct-2020	A2S1 13-Oct-2020
Lab Number:		2455187.1	2455187.2	2455187.3	2455187.4	2455187.5
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	0.03
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	-	0.030
Benzo[e]pyrene	mg/kg dry wt	-	-	-	-	0.021
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	-	0.016
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	-	< 0.012
Chrysene	mg/kg dry wt	-	-	-	-	0.021
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	-	< 0.012
Fluoranthene	mg/kg dry wt	-	-	-	-	0.043
Fluorene	mg/kg dry wt	-	-	-	-	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	-	0.017
Naphthalene	mg/kg dry wt	-	-	-	-	< 0.06
Perylene	mg/kg dry wt	-	-	-	-	< 0.012
Phenanthrene	mg/kg dry wt	-	-	-	-	0.017
Pyrene	mg/kg dry wt	-	-	-	-	0.040

Sample Name:		A2S2 13-Oct-2020	A2S3 13-Oct-2020	A2S4 13-Oct-2020	A3S1 13-Oct-2020	A3S2 13-Oct-2020
Lab Number:		2455187.6	2455187.7	2455187.8	2455187.9	2455187.10
Individual Tests						
Dry Matter	g/100g as rcvd	90	85	88	90	85
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	4	5	6	17
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	0.12	0.18
Total Recoverable Chromium	mg/kg dry wt	11	12	11	15	19
Total Recoverable Copper	mg/kg dry wt	4	4	5	7	10
Total Recoverable Lead	mg/kg dry wt	21	14.5	13.9	21	360
Total Recoverable Nickel	mg/kg dry wt	8	8	7	11	11
Total Recoverable Zinc	mg/kg dry wt	48	45	50	72	183
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	< 0.3	< 0.3	< 0.3	0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	0.044
2-Methylnaphthalene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	0.031
Acenaphthylene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	< 0.012
Acenaphthene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	< 0.012
Anthracene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	< 0.012
Benzo[a]anthracene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	0.019
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.011	0.016	0.014	< 0.011	0.021
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.03	< 0.03	< 0.03	< 0.03	0.03
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.03	< 0.03	< 0.03	< 0.03	0.03
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.012	0.021	0.017	< 0.011	0.031
Benzo[e]pyrene	mg/kg dry wt	< 0.011	0.015	0.014	< 0.011	0.023
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	0.014
Benzo[k]fluoranthene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	0.012
Chrysene	mg/kg dry wt	< 0.011	0.012	0.011	< 0.011	0.020
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	< 0.012
Fluoranthene	mg/kg dry wt	0.020	0.030	0.029	< 0.011	0.042
Fluorene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.011	0.012	< 0.011	< 0.011	0.015
Naphthalene	mg/kg dry wt	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Perylene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.011	< 0.012
Phenanthrene	mg/kg dry wt	< 0.011	< 0.012	0.011	< 0.011	0.039
Pyrene	mg/kg dry wt	0.018	0.026	0.024	< 0.011	0.043

Sample Type: Soil						
Sample Name:		A3S3 13-Oct-2020	A3S4 13-Oct-2020	A3S5 13-Oct-2020	A4S1 13-Oct-2020	A4S2 13-Oct-2020
Lab Number:		2455187.11	2455187.12	2455187.13	2455187.14	2455187.15
Individual Tests						
Dry Matter	g/100g as rcvd	82	91	86	-	-
Total Recoverable Lead	mg/kg dry wt	-	-	-	1,160	53
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	290	142	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.52	0.21	-	-
Total Recoverable Chromium	mg/kg dry wt	15	119	60	-	-
Total Recoverable Copper	mg/kg dry wt	7	149	175	-	-
Total Recoverable Lead	mg/kg dry wt	21	440	85	-	-
Total Recoverable Nickel	mg/kg dry wt	11	11	10	-	-
Total Recoverable Zinc	mg/kg dry wt	70	390	151	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.3	1.7	< 0.3	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.012	0.040	< 0.012	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.012	0.052	< 0.012	-	-
Acenaphthylene	mg/kg dry wt	< 0.012	0.015	< 0.012	-	-
Acenaphthene	mg/kg dry wt	< 0.012	< 0.011	< 0.012	-	-
Anthracene	mg/kg dry wt	< 0.012	0.025	< 0.012	-	-
Benzo[a]anthracene	mg/kg dry wt	0.016	0.109	0.014	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.019	0.103	0.017	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.03	0.17	0.03	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.03	0.16	0.03	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.027	0.147	0.022	-	-
Benzo[e]pyrene	mg/kg dry wt	0.019	0.090	0.017	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.013	0.077	0.014	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.012	0.058	< 0.012	-	-
Chrysene	mg/kg dry wt	0.020	0.130	0.016	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.012	0.020	< 0.012	-	-
Fluoranthene	mg/kg dry wt	0.035	0.26	0.032	-	-
Fluorene	mg/kg dry wt	< 0.012	0.016	< 0.012	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.015	0.079	0.014	-	-
Naphthalene	mg/kg dry wt	< 0.06	0.10	< 0.06	-	-
Perylene	mg/kg dry wt	< 0.012	0.025	< 0.012	-	-
Phenanthrene	mg/kg dry wt	0.024	0.124	< 0.012	-	-
Pyrene	mg/kg dry wt	0.039	0.25	0.030	-	-

Sample Name:		A4S3 13-Oct-2020	A4S4 13-Oct-2020	A4S5 13-Oct-2020		
Lab Number:		2455187.16	2455187.17	2455187.18		
Individual Tests						
Total Recoverable Lead	mg/kg dry wt	1,090	126	94	-	-

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 Rapid Sample Preparation*	Dried at 103°C (removes 3-5% more water than air dry) for a minimum of 2hr, gravimetry. Replaces Environmental Solids Sample Prep under certain circumstances.	-	14-18
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-13

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Environmental Solids Sample Drying*	Dried at 103°C (removes 3-5% more water than air dry) for a minimum of 2hr, gravimetry. Replaces Environmental Solids Sample Prep under certain circumstances.	-	14-18
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	5-13
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	5-13
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-4
Organochlorine/nitro&phosphorus Pest.s Screen in Soils, GCMS	Sonication extraction, GC-ECD and GC-MS analysis. In-house based on US EPA 8081 and US EPA 8270.	-	1-4
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	5-13
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	1-13
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	14-18
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	14-18
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	5-13
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	5-13

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

Testing was completed between 15-Oct-2020 and 16-Oct-2020. 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.

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

Version Number: 10 | Date Issued: August 2020 | Authorised By: JC | Controlled Document

Client Name:	ENGEO Christchurch	**Job Number:**	T003137.2	**Total Samples Received:**	6
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	P2020.002.259_735	**Date Received:**	13/10/2020
Client Reference:	P2020.002.259_735			**Date Analysed:**	14/10/2020
Client Contact:	Natalie Flatman	**Analyst:**	Lisa Bullock	**Date Reported:**	14/10/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T003137.2.1	1	A3S1 @ 0.0-0.2 mbg, Soil											
		Layer 1: >10 mm	1299.05	8.13	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		59.78	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		1098.26	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		50.30									
		Total sample weight:		1166.17	Total Combined:	0.00000	0.00000	0.00000					
T003137.2.2	2	A3S2 @ 0.0-0.2 mbg, Soil											
		Layer 1: >10 mm	1119.16	16.53	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		47.45	Organic Fibres Synthetic Mineral Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		896.67	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		51.78	Synthetic Mineral Fibres								
		Total sample weight:		960.65	Total Combined:	0.00000	0.00000	0.00000					
T003137.2.3	3	A3S3 @ 0.0-0.2 mbg, Soil											
		Layer 1: >10 mm	1156.98	0.00	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		7.29	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		910.05	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		51.58									
		Total sample weight:		917.34	Total Combined:	0.00000	0.00000	0.00000					

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

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Client Name:	ENGEO Christchurch	**Job Number:**	T003137.2	**Total Samples Received:**	6
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	P2020.002.259_735	**Date Received:**	13/10/2020
Client Reference:	P2020.002.259_735			**Date Analysed:**	14/10/2020
Client Contact:	Natalie Flatman	**Analyst:**	Lisa Bullock	**Date Reported:**	14/10/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T003137.2.4	4	A3S4 @ 0.0-0.2 mbg, Soil											
		Layer 1: >10 mm	877.55	17.67	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		49.88	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		770.39	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		53.15									
		Total sample weight:		837.94	Total Combined:	0.00000	0.00000	0.00000					
T003137.2.5	5	A3S5 @ 0.0-0.2 mbg, Soil											
		Layer 1: >10 mm	919.20	44.11	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00000%	0.00000%	0.00000%	No Asbestos Detected
		Layer 2: 10 - 2 mm		30.34	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3: <2 mm		739.51	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		51.65									
		Total sample weight:		813.96	Total Combined:	0.00000	0.00000	0.00000					

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

Client Name:	ENGEO Christchurch	**Job Number:**	T003137.2	**Total Samples Received:**	6
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	P2020.002.259_735	**Date Received:**	13/10/2020
Client Reference:	P2020.002.259_735			**Date Analysed:**	14/10/2020
Client Contact:	Natalie Flatman	**Analyst:**	Lisa Bullock	**Date Reported:**	14/10/2020

ASBESTOS IN SOIL ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Received Weight (g)	Dry Weight (g)	Results	ACM Weight (g)	FA Weight (g)	AF Weight (g)	ACM w/w %	FA w/w %	AF w/w %	Combined AF/FA %	Comments
T003137.2.6	6	A4S6 @ 0.0-0.1 mbg, Soil											
		Layer 1: >10 mm	1170.84	190.15	Organic Fibres	0.00000	0.00000	0.00000	0.00000%	0.00961%	0.00000%	0.00961%	
		Layer 2: 10 - 2 mm		26.30	**Chrysotile (White Asbestos) Amosite (Brown Asbestos)** Organic Fibres	N/A	0.09571	0.00000					
		Layer 3: <2 mm		779.41	Organic Fibres	N/A	0.00000	0.00000					
		Layer 3 sub sampled weight:		49.88									
		Total sample weight:		995.86	Total Combined:	0.00000	0.09571	0.00000					

Method References and Disclaimers

Samples were analysed in accordance with:
AS4964-2004 Australian Standard - Method for Qualitative Identification of Asbestos in Bulk Samples
BRANZ - New Zealand Guidelines for Assessing and Managing Asbestos in Soil 2017

Disclaimers:
Samples are reported 'As Received'. Terra Scientific takes no responsibility for sampling processes, client sample descriptions and sample locations as these were provided by the client.
The results presented in this report relate specifically to the samples submitted for this job.
The detection limit is 0.1g/1kg (0.01% w/w) as stated in the AS4964-2004. Samples that contain asbestos less than this limit are outside the scope of accreditation.
Asbestos calculations are outside the scope of accreditation.
All opinions and interpretations are outside the scope of accreditation.
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For any queries regarding this report, please do not hesitate to contact the laboratory and speak with the Key Technical Person.

Sarah Giles
Company Position
Key Technical Person

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ACCREDITED IANZ TESTING LABORATORY Nº 1334

Client Name:	ENGEO Christchurch	**Job Number:**	T003137.1	**Total Samples Received:**	2
Client Address:	124 Montreal Street, Sydenham, Christchurch, 8023	**Site Reference / Address:**	P2020.002.259_735	**Date Received:**	13/10/2020
Client Reference:	P2020.002.259_735			**Date Analysed:**	14/10/2020
Client Contact:	Natalie Flatman	**Analyst:**	Lisa Bullock	**Date Reported:**	14/10/2020

ASBESTOS ANALYSIS REPORT

Laboratory Sample Number	Client Sample Number	General Description	Results	Comments
T003137.1.1	1	A3 PACM1, Cement board Off white painted cement **Sample Weight:** 102.38 g	**Chrysotile (White Asbestos)** **Amosite (Brown Asbestos)** Organic Fibres	
T003137.1.2	2	A456 PACM1, Cement board Off white painted cement **Sample Weight:** 15.98 g	**Chrysotile (White Asbestos)** **Amosite (Brown Asbestos)** **Crocidolite (Blue Asbestos)** Organic Fibres	

Method References and Disclaimers

Samples were analysed in accordance with: AS4964-2004 Australian Standard - Method for Qualitative Identification of Asbestos in Bulk Samples

Disclaimers:
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- The results presented in this report relate specifically to the samples submitted for this job.
- The detection limit is 0.1g/1kg as stated in the AS4964-2004.
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Laboratory Analyst
Key Technical Person