Nukuhau Taupo Plan Change

Detailed Site Investigation

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Revision Details

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Executive Summary

This Detailed Site Investigation (DSI) has been completed as part of a Structure Plan and application for a Private Plan Change (PPC) to Taupō District Council (TDC) to rezone areas of land in the Taupō District Plan (TDP) to enable residential development of approximately 800 additional residential lots. As HAIL activities were identified as part of the Preliminary Site Investigation (PSI), the DSI was conducted and laboratory analysis completed to determine the contamination risk to human health and the environment and possible remedial actions.

This investigation and report has been completed in general accordance with the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) and the Ministry for the Environment Contaminated Land Management Guidelines No. 1 and No. 5.

From assessing the available information gathered as part of the PSI and the laboratory analysis completed as part of this DSI the following has been determined:

- Some low levels of PAHs and one low level detection of OCP was detected around the old shed. The levels of contamination were however below the human health soil contaminant standards.
- Parameters in the buried woodwaste were all at or below the 95% upper limit for background. It is likely that other fill areas will be of similar nature.
- Zinc was above background around the old shed with one sample being equal to the ANZECC 'upper' guideline values for sediment quality. This is a reflection of the galvanized steel used in the sheds construction. Nickel was above background and the ANZECC 'upper' guideline values for sediment quality at Foundation 2. No human health SCSs were exceeded.
- There were no asbestos fibres detected in the soil surrounding the old residential foundations. It is highly unlikely that this soil poses a risk to human health.
- Cadmium levels in the pasture areas although elevated compared to non-pasture levels were just below the 95% upper limit for background. No human health SCSs were exceeded.

This DSI, although having detected some contaminants associated with the possible HAIL activities identified by the PSI has not found any contamination that exceeds the human health SCSs specified in section 8.1. There were no asbestos fibres found in the soils surrounding the residential foundations. *It is therefore highly unlikely that the areas investigated will be a risk to human health given the intended activity*.

There were metals above the predicted background levels (*Table 5*, Section 8.2). The material in these locations are therefore not suitable for use as cleanfill offsite. Although some of these levels are at or above the ANZECC 'upper' guideline values for sediment quality, the small size of the areas combined with the distance and vegetation cover between the sites and receiving waters are likely to result in very large dilution before water is discharged. The well drained nature of the soils means that under normal conditions it is unlikely that there will be much in the way of stormwater runoff.

The following recommendations are therefore made:

- Material within 5m radius of the old shed and Foundation 2 does not exceed the human health SCSs. However, if it is to be removed from site, it should be disposed at a Class A Landfill because there is exceedance of the Class B landfill acceptance criteria and predicted background levels.

- Although the fill material that was investigated adjacent to the old shed was found to be uncontaminated and it is reasonable to assume the remaining areas subject to fill and land disturbance will be of similar nature, a site management plan including an unexpected discovery protocol should be developed for the site. This is so appropriate steps are in place to detect unidentified buried material that may be hazardous to human health or the environment during earthworks. The document should also specify appropriate controls and steps to be taken in the event that hazardous material is exposed. The plan should pay particular attention to the areas that have been identified as historic fill / soil disturbance.
- Possible ACM fragments identified during the PSI walkover should be handpicked, double bagged and taken to an appropriate facility for disposal.

This report excludes any geotechnical considerations that could arise from the filling activities.

1 Introduction

This Detailed Site Investigation (DSI) has been completed as part of a Structure Plan and application for a Private Plan Change (PPC) to Taupō District Council (TDC) to rezone areas of land in the Taupō District Plan (TDP) to enable residential development of approximately 800 additional residential lots. As HAIL activities were identified as part of the Preliminary Site Investigation (PSI), the DSI was conducted and laboratory analysis completed to determine the contamination risk to human health and the environment and possible remedial actions.

This investigation and report has been completed in general accordance with the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) and the Ministry for the Environment Contaminated Land Management Guidelines No. 1 and No. 5.

2 Scope

Of the five HAIL activities identified in the PSI, this DSI has investigated the following:

- possible fill and land disturbance (1971 to 1997) associated with the sawmill and location of former coal yard on Rangatira 8A6B1 Block Māori Land Plan 22228 (Site 1).
- the potential asbestos contamination in soil surrounding old building foundations and potential cadmium elevation as a result of superphosphate application at Lot 2 DP 384060 (Site 3).

The glasshouse and possible fill activities at 29 to 79 Watene Lane (Site 5) were not investigated as part of this investigation as they are already developed and therefore outside of the Structure Plan scope.

3 Site Location

The two plans in Figure 1 show the areas investigated as part of the investigation. At site 1, investigations focused on the primary investigation area shown in the first plan. This was identified as the primary location of the HAIL activities associated with the sawmill and coal yard and also contained a valley that had obviously been filled in the past. If contamination was not present in this location, then it was considered highly unlikely that the remainder fill / land disturbance area (yellow area extending into sites 2 and 5) would be contaminated. If contamination was identified in this location above the Soil Contaminant Standards (SCS), then investigations were to be expanded into the wider area of fill / land disturbance.

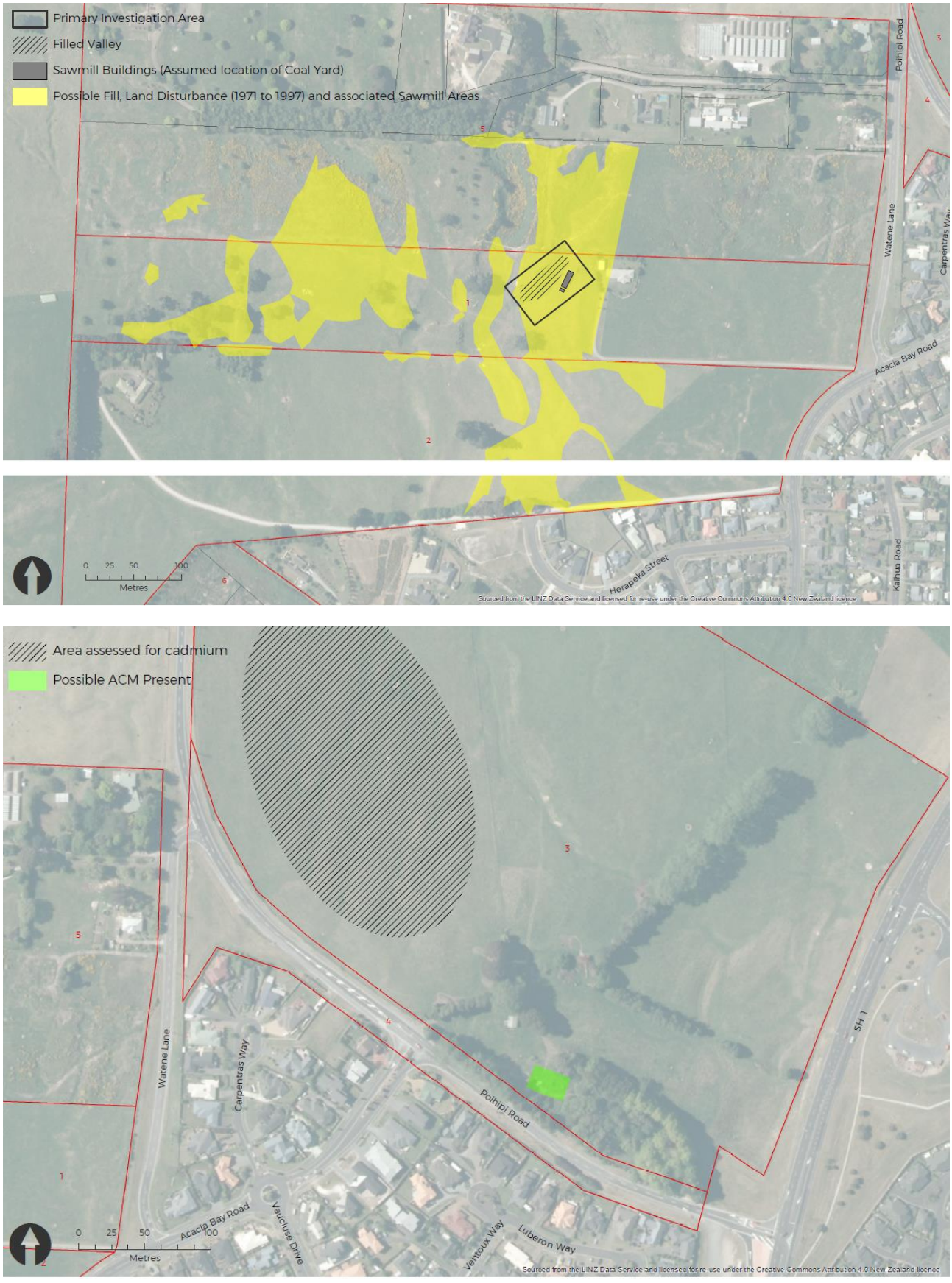

Figure 1 – Plans showing areas investigated

4 Site History

In order to determine the site history, a review of the following sources of information has been completed during the PSI – Historic Aerials, Property Files and the Taupō District Council HAIL Register.

Historic Aerial imagery was reviewed from Retrolens, LINZ, Taupō District Council and Google Earth Imagery. The aerial imagery covered seven decades from 1945 to 2017. There was an 18-year gap in the imagery from 1946 to 1964 and a 12-year gap from 1985 to 1997. Due to licencing issues Google Earth Imagery cannot be reproduced in WSP OPUS reports.

The property files reviewed as part of the PSI were requested by WSP Opus on 19 and 25 February 2019. Taupō Distict Council were contacted on 19 February 2019 to check their Hazardous Activities and Industries List (HAIL) register. No HAIL activities were identified on the register.

The following sections provide a summary of the site history findings. Further detail was provided in the WSP Opus PSI which was completed in March 2019.

4.1.1 Rangatira 8A6B1 Block Māori Land Plan 22228 (Site 1)

The aerial imagery showed the following landuses for site 1:

1945 to 1967 – Scrub / Bush

1971 to 1997 – Land disturbance. Possible sawmill. Possible Coal Yard.

1997 to present – Scrub / pasture

The property file contained the following pertinent information:

February 1995 – Māori Land Court documents note dwelling on property since 1971. Property has been in ownership of Hinemoa Henderson, Huis Warbrick, Mauke Tuangaange Wiremu, Patiti Warbrick and Pohihipi Warbrick since at least 1959. The document has written statements from affected parties:

- It was noted by Nepia Williams that Mrs Henderson ran a sawmill across the gully and has used the area as a dumping ground for slabs and sawdust. The area was levelled using giant discs, but the development was not possible “because of the pollution and obstruction of the sawmill”.
- It was noted by Rangi Aubrey that the gully area was “polluted” by Hinemoa and her husband.
- Mrs Henderson refuted claims that the area was polluted.

The court ordered that Rangatira be partitioned into Rangatira 8A6B1 and Rangatira 8A6B2.

4.1.2 Lot 2 DP 384060 (Site 3)

The aerial imagery showed the following landuses for site 3:

1945 to 1946 – Scrub / Bush

1964 to present – Farm / Pasture with rural residential

The property file contained the following pertinent information:

1992 - noted as “bull paddock” in undated engineering report

July 1996 - Consent notice re subdivision noting that the site is used for farming.

5 Geology and Hydrology

5.1 Soil and Geology

The S-Map Online Soils Map Viewer indicates that the site is located on Taupo Immature Orthic Pumice Soil. This soil is sandy loam in nature, well drained and has no significant barrier within 1 mbgl. The functional horizons are documented in Table 1.

Table 1 - Soil functional horizon for Taupo Immature Orthic Pumice Soil [1]

Functional Horizon	Thickness	Stones	Clay*	Sand*
Stony (lapilli) Sandy Weak, Acidic Tephric	10 - 15 cm	30 - 35 %	2 - 5 %	80 - 90 %
Stony (lapilli) Sandy Weak, Acidic Tephric	10 - 15 cm	30 - 35 %	2 - 5 %	80 - 90 %
Very Stony (lapilli) Sandy Loose, Acidic Tephric	70 - 80 cm	60 - 70 %	0 - 3 %	80 - 90 %

NZ 1:250k Geological Units are identified as predominately Holocene igneous rocks. Holocene igneous rocks are described as "primary, non-welded ignimbrite and reworked deposits from the 181 AD Taupo eruption; very low-density pumice". Subsidiary rocks are identified as pumice, ash, gravel, sand and silt.

5.2 Topography, Surface Water and Hydrogeology

The areas are located on rural land at an elevated position, between 410 and 450m above sea level and overlooks Lake Taupō (1.2km south) and the Taupō CBD (1.5km north-east). Residential land exists to the south of the areas with rural and farmland to the north. Stormwater from areas 1 either percolates into the pumice and ash soils of the region into the ignimbrite aquifers or flows overland eventually ending up in Lake Taupō. Stormwater from areas 3 will percolate into the pumice and ash soils of the region into the ignimbrite aquifers or flow overland and through Taupō District Council stormwater assets into the Waikato River.

Groundwater flows are documented by the Waikato Regional Council as following the general topology of the area towards Lake Taupō and the Waikato River.

The residential areas to the south are reticulated to the TDC water supply.

6 Site visit

A site visit was completed as part of the PSI on 21 February 2019.

Site	Site Observations
1	Now used for cattle, there are some old concrete footings and bits of old timber present to the western end of the site. Site is quite undulating and weathered areas indicate that the material onsite in these locations is natural. One valley area which is adjacent to an old shed that may have been part of the old sawmill looks like it may have been filled.

[1] clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)

Site	Site Observations
	 Possible filled gully adjacent to old shed  Inside old shed.

Site	Site Observations
3	Foundation of what is presumed to be an old storage shed located as was the house. The old storage shed foundations have a new tin shed built on top of them. Some possible asbestos sheeting (asbestos containing material [ACM]) around the old house foundations. Remainder of the site was farmland with no obvious signs of contamination.  Foundations of old shed with new tin shed (Left), Possible ACM around foundations of old house (Right).

Site	Site Observations
	 House foundations

7 Sampling and Analysis Plan

The field investigation programme included the collection of twenty soils samples from sites 1 and 3 for submission to an IANZ accredited laboratory. Sample locations were chosen based on the findings of the PSI. The following analysis was completed:

- 5 samples around and beneath possible sawmill and coal yard shed for metals, OCPs and PAHs at Site 1 (Shed 1 to Shed 5, locations shown in Figure 2 and Photo 2).
- Two test pits within the filled valley, each with three samples for Metals, OCPs and PAHs at Site 1 (Samples 1, 2, and 3 at test pit 1 and 4, 5 and 6 at test pit 2, locations shown in Figure 2 and Photo 1).
- 1 near surface soil sample at undisturbed location near the filled valley on top of flat, tested for Metals, OCPs and PAHs (Sample 7, location shown in Figure 2 and Photo 1).
- 5 samples for presence/absence of asbestos and heavy metals around foundations of the old residential building at Site 3 (Foundation 1 to 5, locations shown in Figure 3, Photo 3 and Photo 4).
- 3 samples for Cd and pH on the farm at Site 1 (Farm 1 to 3, locations shown in Figure 3).

Figure 2, Figure 3, Photo 1, Photo 2, Photo 3 and Photo 4 are provided for perusal on the following pages.

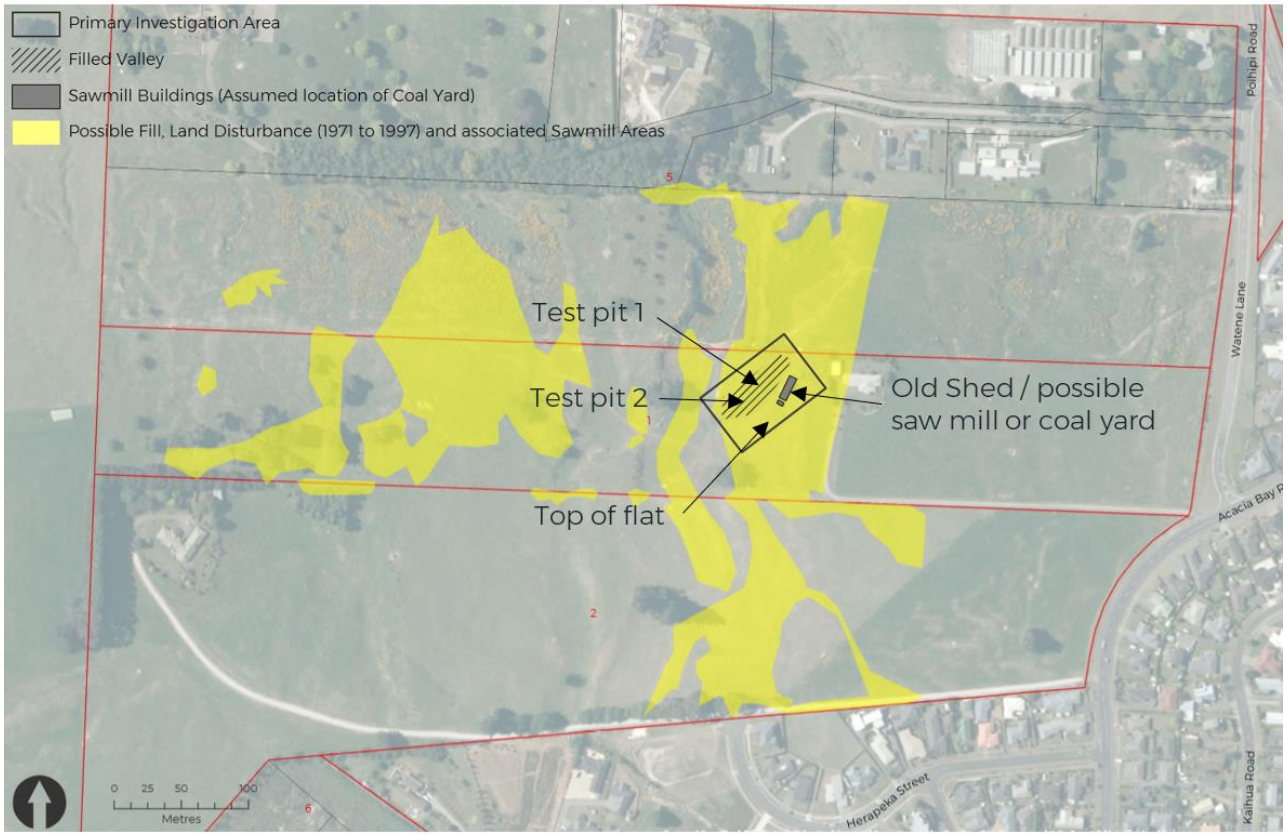

Figure 2 - Plan showing sample locations on site 1

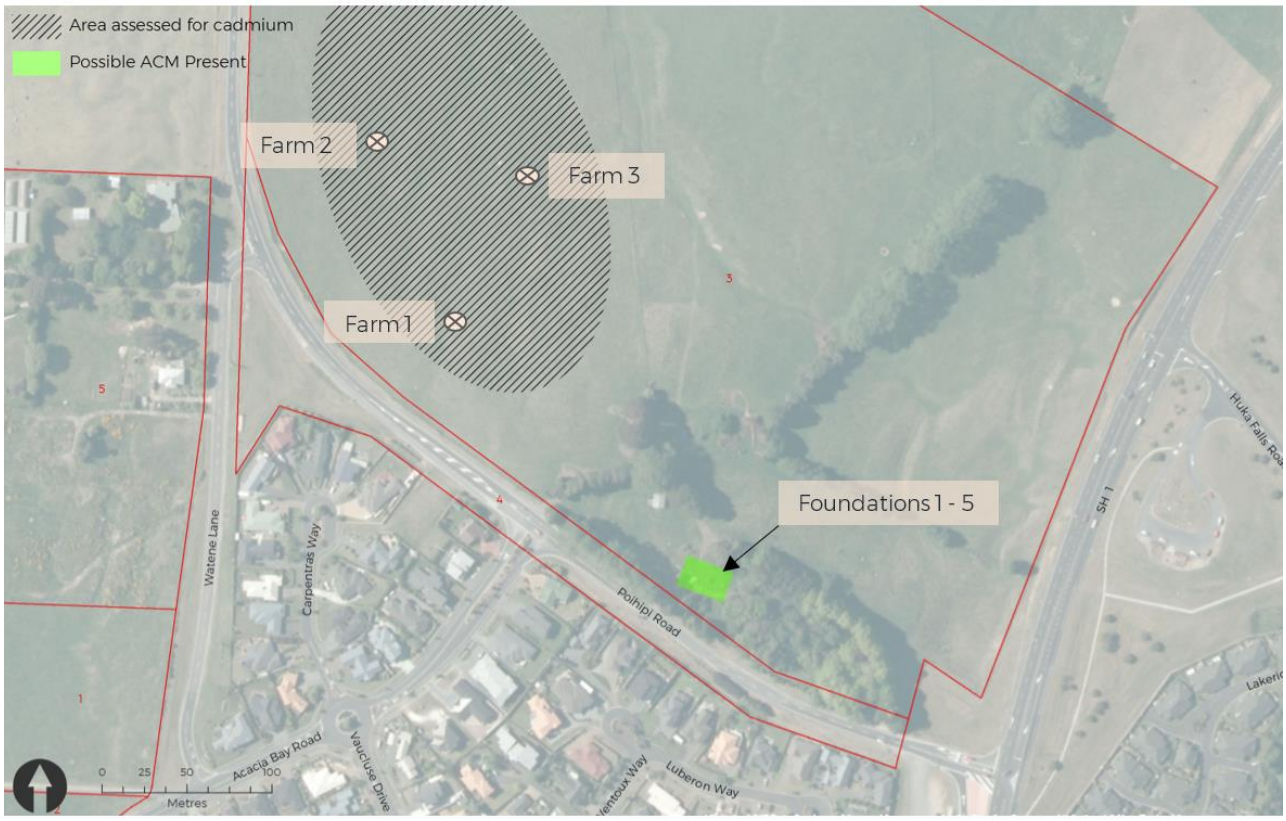

Figure 3 - Plans showing sample locations on site 3

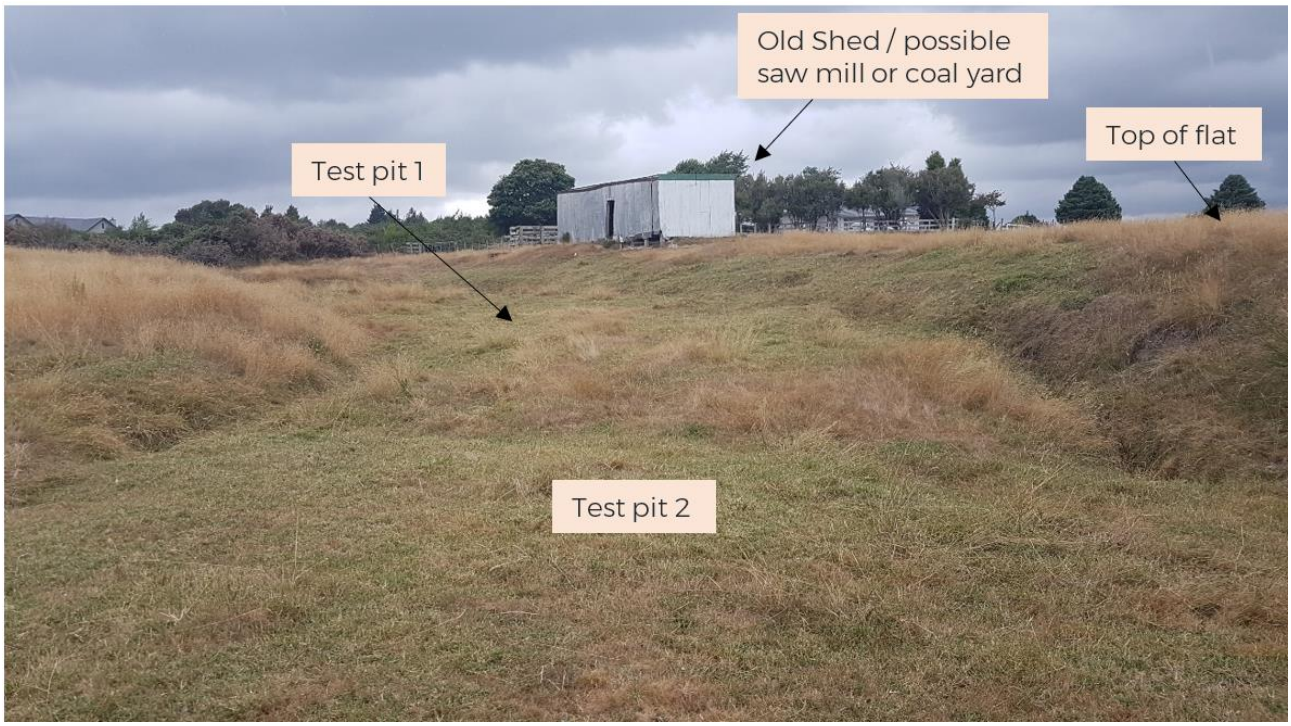

Photo 1 - Sampling locations for site 1.

Photo 2 - Sampling locations for site 1.

Photo 3 - Sampling locations for Site 3

Photo 4 - Sampling locations for site 3

The following section has compared the results against the human health and environmental soil and water contaminant standards (SCS and WCS respectively) outlined in Section 8. A complete record of laboratory analytical results have been provided in Appendix A. Table 8 shows a description of the samples taken during this investigation. Additional information on sample locations is provided in Section 7.

Table 8 - Sample descriptions

7.1 Field Quality Assurance and Quality Control (QA/QC)

The following procedures were adopted during soil investigation works:

- All fieldwork was carried out in compliance with a project specific Health and Safety Plan prepared for the site works.
- All works were conducted by trained WSP Opus staff with precautions including implementation of procedures for the appropriate handling of potentially contaminated material.
- Prior to sampling, and between sample locations, equipment used to retrieve samples was cleaned by washing with potable water to minimise the chance of cross contamination. Soil samples were collected using a hand trowel. A clean pair of nitrile gloves was also used for each sample location. All samples were placed into labelled laboratory supplied sample containers.
- Following collection, all samples were transported, under standard chain of custody procedures, to an IANZ accredited laboratory (Hill Laboratories) for analysis.

7.2 Laboratory QA/QC

Laboratory reports from Hill Laboratories have been included in Appendix A. These include the analytical methods used by the laboratory and the laboratory accreditation for analytical methods used.

All Laboratory Analysis was completed through Hill Laboratories. Hill Laboratories are 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.

8 Basis for Guideline Values

8.1 Human Health

Soil Contaminant Standards (SCSs) were selected from "Table B2 – Soil Contaminant Standards for health (SCS (health)) for inorganic substances" and "Table B3 – Soil Contaminant Standards for health (SCSs (health)) for organic compounds" of the "User's Guide – National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human. Where there was no figure then a SCS was selected from the Australian National Environmental Protection Measures (NEPM), which is consistent with CLMG 2 Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011).

Results were compared to the "Rural Residential / Lifestyle block 25% produce" values or similar as this description is the most representative of the end land use.

Table 2 - Soil contaminant standards for health (SCSs(health)) for inorganic substances

	Arsenic	Boron	Cadmium (pH 5)[1]	Chromium		Copper	Inorganic lead	Inorganic mercury
				III	VI			
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Rural residential / lifestyle block 25% produce	17	>10,000	0.8	>10,000	290	>10,000	160	200
Residential 10% produce	20	>10,000	3	>10,000	460	>10,000	210	310
High-density residential	45	>10,000	230	>10,000	1,500	>10,000	500	1,000
Recreation	80	>10,000	400	>10,000	2,700	>10,000	880	1,800
Commercial / industrial outdoor worker (unpaved)	70	>10,000	1,300	>10,000	6,300	>10,000	3,300	4,200

The Australian National Environmental Protection Measures (NEPM) specify low density residential soil contaminant standards for Nickel (400g.m-3) and Zinc (7400 g.m-3).

Table 3 - Soil contaminant standards for health (SCSs(health)) for organic compounds

Scenario	BaP[1]	DDT	Dieldrin[2]	PCP	Dioxin	
					TCDD	Dioxin-like PCBs
	mg/kg TEQ	mg/kg	mg/kg	mg/kg	µg/kg TEQ	µg/kg TEQ
Rural residential / lifestyle block 25% produce	6	45	1.1	55	0.12	0.09
Residential 10% produce	10	70	2.6	55	0.15	0.12
High-density residential	24	240	45	110	0.35	0.33
Recreation	40	400	70	150	0.6	0.52
Commercial / industrial outdoor worker (unpaved)	35	1,000	160	360	1.4	1.2

Asbestos SCS for Fibrous Asbestos (FA), Asbestos Fines (AF) and Asbestos Containing Materials (ACM) from The New Zealand Guidelines for Assessing and Managing Asbestos in Soil that are published by BRANZ were to be used if asbestos fibres were identified during the presence / absence test and the New Zealand Guidelines Semi Quantitative Asbestos in Soil tests were required.

The SCS for PAHs in *Table 4* were sourced from table 4.10 in the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (revised 2011).

Table 4 - Soil Acceptance Criteria Residential Use ALL PATHWAYS

Soil Type/ Contaminant	Depth of contamination		
	Surface (<1m)	1m - 4m	> 4m
PUMICE			
MAHs			
Benzene	1.2 (v)	2.4 (v)	3.1 (v)
Toluene	(73) (4,v)	(240) (4,v)	(350) (4,v)
Ethylbenzene	(48) (4,v)	(140) (4,v)	(220) (4,v)
Xylenes	(53) (4,v)	(180) (4,v)	(260) (4,v)
PAHs			
Naphthalene	49 (v)	140 (v)	(220) (4,v)
Non-carc. (Pyrene)	(1,600) (4,p)	NA (2)	NA (2)
Benzo(a)pyrene eq. (5)	0.27 (p)	(25) (4,m)	NA (2)

8.2 Environmental

Predicted background levels have been sourced from Landcare Research's Land Resource Information Systems Portal for the area and are included in *Table 5*. This data is intended "to provide an initial assessment of background soil concentrations at locations that are being assessed for use as clean-fills or managed fill or for the assessment of contaminated land". These have been used in preference to the Waikato Regional Council Natural background concentrations because they are specific to the geological classification unit and accounts for the natural variation in soils based on their underlying geology.

Table 5 - Predicted Background Concentration (PBC) for geological unit classification represented as mean and 95th quantile estimates of the background concentration (mg/kg)[2]

Element	Symbol	Number of Samples	Median Background	95% upper limit for background (mg/kg)
Arsenic	As	91	3.9	16.4
Cadmium	Cd	31	0.1	0.5
Chromium	Cr	100	13.9	67.4
Copper	Cu	51	9.8	42.2
Lead	Pb	99	6.8	24.8
Nickel	Ni	100	6.0	33.8
Zinc	Zn	32	31.3	129.7

The ANZECC Default guideline values (DGVs) for metal toxicants in sediment are listed in *Table 6*. As per the DGVs for toxicants in water, the sediment DGVs indicate the concentrations below which there is a low risk of unacceptable effects occurring and should be used to help ensure the protection of aquatic ecosystems. In contrast, the 'upper' guideline values (GV-high), also listed in *Table 6*, provide an indication of concentrations at which you might already expect to observe toxicity-related adverse effects (ANZECC, 2018).

Table 6 - Revised toxicant default guideline values and 'upper' guideline values for sediment quality

Toxicant	DGV (mg/kg)	GV-high (mg/kg)
Arsenic	20	70
Cadmium	1.5	10.0
Chromium	80	370
Copper	65	270
Lead	50	220
Nickel	21	52
Zinc	200	410

Class A and Class B landfill acceptance criteria have been provided in Table 7 for the contaminants of concern.

[2] https://lris.scinfo.org.nz/layer/48470-pbc-predicted-background-soil-concentrations-new-zealand/. Figures rounded to nearest single decimal point.

Table 7 - Landfill Acceptance Criteria

	Class A Landfill		Class B Landfill	
	Screening Criteria (mg/kg)	Concentration in Leachate (mg/kg)	Screening Criteria (mg/kg)	Concentration in Leachate (mg/kg)
Arsenic	100	53	10	0.5
Cadmium	20	1	2	0.1
Chromium (VI)	100	53	10	0.5
Copper	100	55	10	0.5
Lead	100	53	10	0.5
Nickel	200	10	20	1
Zinc	200	105	20	1
Naphthalene	200	10	20	1
Aldrin	0.00016	0.0008	0.000016	0.000008
Dieldrin	8	0.4	8	0.04
Endosulfan	6	0.3	0.6	0.03

9 Summary of Results

The following section has compared the results against the human health and environmental soil and water contaminant standards (SCS and WCS respectively) outlined in Section 8. A complete record of laboratory analytical results have been provided in Appendix A. Table 8 shows a description of the samples taken during this investigation. Additional information on sample locations is provided in Section 7.

Table 8 - Sample descriptions

Sample Name	Location	Natural ground / Unnatural ground	Depth	Comments
1	Test Pit 1 – Filled valley	Unnatural	1.0m	Wood Pulp
2	Test Pit 1 - Filled valley	Unnatural	0.3m	Pumice loam
3	Test Pit 1 - Filled valley	Unnatural	2.0m	Wood Pulp
4	Test Pit 2 - Filled valley	Unnatural	0.3m	Grey fine silt/ash near surface
5	Test Pit 2 - Filled valley	Unnatural	0.3m	Pumice loam
6	Test Pit 2 - Filled valley	Unnatural	1.0m	WoodPulp

Sample Name	Location	Natural ground / Unnatural ground	Depth	Comments
7	Top of flat, near test pits	Natural	0.15m	Near surface sample of 'clean ground'
Shed 1	Old Shed / possible saw mill or coal yard	Disturbed	0.10m	Area of runoff from beneath the shed
Shed 2	Old Shed / possible saw mill or coal yard	Disturbed	0.10m	Near foundation footings
Shed 3	Old Shed / possible saw mill or coal yard	Disturbed	0.10m	Near foundation footings
Shed 4	Old Shed / possible saw mill or coal yard	Disturbed	0.10m	Near foundation footings
Shed 5	Old Shed / possible saw mill or coal yard	Disturbed	0.10m	Area of runoff from beneath the shed
Foundation 1	Old foundations	Disturbed	0.10m	Near previously identified potential ACM
Foundation 2	Old foundations	Disturbed	0.10m	Within concrete rubble
Foundation 3	Old foundations	Disturbed	0.10m	Base of concrete wall
Foundation 4	Old foundations	Disturbed	0.10m	Near old foundations
Foundation 5	Old foundations	Disturbed	0.10m	Near old foundations
Farm 1	See Figure 3	Natural / pasture	0.10m	
Farm 2	See Figure 3	Natural / pasture	0.10m	
Farm 3	See Figure 3	Natural / pasture	0.10m	

9.1 Human Health

All metal results were below the inorganic human health SCSs specified in *Table 2* of Section 8.1.

All Organochlorine Pesticides (OCPs) and Polycyclic Aromatic Hydrocarbons (PAHs) were either below laboratory detection or the organic human health SCSs specified in Table 3 and *Table 4* of Section 8.1.

Low levels of OCPs (0.017mg/kg of 4,4'-DDT) were detected at Shed 3. This is well below the TCDD of 0.12 µg/kg or 120mg/kg as specified in Table 3. OCPs were not detected elsewhere.

Low levels of PAHs were detected at Shed 1 and Shed 3. The BAP TEQ for Shed 1 and Shed 3 was 0.09 mg/kg and <0.04 mg/kg respectively. These are both below the BAP TEQ specified in *Table 4* of Section 8.1 which is 0.27 mg/kg.

9.2 Environment

The following samples were above the 95% upper limit predicted background concentration (PBC) from the Land Resource Information Systems Portal - Shed 1 (174 mg/kg Zinc), Shed (74 mg/kg Nickel), Shed 4 (182 mg/kg Zinc) and Shed 5 (200 mg/kg Zinc).

The following samples were at or above the ANZECC default guideline values and 'upper' guideline values for sediment quality specified in *Table 6* of section 8.2 - Shed 5 (200 mg/kg Zinc)

and Foundation 2 (74 mg/kg Nickel). All other samples were below the ANZECC default guideline values.

A number of samples (2, 3, 4, 5, Shed 1, Shed 2, shed 3, Shed 4, Shed 5, Foundation 1, Foundation2, Foundation 3, Foundation 4 and Foundation 5) exceed the acceptance criteria for Class B landfills, no values exceed the Landfill Class A Acceptance Criteria.

10 Conceptual Site Model

The conceptual site model is used to support the decision-making process for contaminated land management.

The five basic activities associated with developing a conceptual site model are:

- Identification of potential contaminants;
- Identification and characterisation of the source(s) of contamination;
- Delineation of potential migration pathways through environmental media, such as groundwater, surface water, soils, sediment, biota, air, service lines;
- Identification and characterisation of potential receptors (human, ecological or building infrastructure);
- Determination of the limits of the study area or system boundaries.

For there to be an effect on receptors there must be a contamination source and a mechanism (pathway) for contamination to affect human health (receptor).

From assessing the available information gathered as part of the PSI and the laboratory analysis from the sampling program the following has been determined:

- Some low levels of PAHs and one low level detection of OCP was detected around the old shed. The levels of contamination were however below the human health soil contaminant standards.
- Parameters in the buried woodwaste were all at or below the 95% upper limit for background. It is likely that other fill areas will be of similar nature.
- Zinc was above background around the old shed with one sample being equal to the ANZECC 'upper' guideline values for sediment quality. This is a reflection of the galvanized steel used in the sheds construction. Nickel was above background and the ANZECC 'upper' guideline values for sediment quality at Foundation 2. No human health SCSs were exceeded.
- There were no asbestos fibres detected in the soil surrounding the old residential foundations. It is highly unlikely that this soil poses a risk to human health.
- Cadmium levels in the pasture areas although elevated compared to non-pasture levels were just below the 95% upper limit for background. No human health SCSs were exceeded.

Based on the above information it is highly unlikely that the site poses a risk to human health. The areas where metals were above background and ANZECC were very small. The distance and vegetation cover between these sites and receiving waters are likely to result in very large dilution before water is discharged. The well drained nature of the soils means it is unlikely that there will be much in the way of stormwater runoff.

11 Conclusions and Recommendations

This DSI, although having detected some contaminants associated with the possible HAIL activities identified by the PSI has not found any contamination that exceeds the human health SCSs specified in section 8.1. There were no asbestos fibres found in the soils surrounding the residential foundations. *It is therefore highly unlikely that the areas investigated will be a risk to human health given the intended activity*.

There were metals above the predicted background levels (*Table 5*, Section 8.2). The material in these locations are therefore not suitable for use as cleanfill offsite. Although some of these levels are at or above the ANZECC 'upper' guideline values for sediment quality, the small size of the areas combined with the distance and vegetation cover between the sites and receiving waters are likely to result in very large dilution before water is discharged. The well drained nature of the soils means that under normal conditions it is unlikely that there will be much in the way of stormwater runoff.

The following recommendations are therefore made:

- Material within 5m radius of the old shed and Foundation 2 does not exceed the human health SCSs. However, if it is to be removed from site, it should be disposed at a Class A Landfill because there is exceedance of the Class B landfill acceptance criteria and predicted background levels.
- Although the fill material that was investigated adjacent to the old shed was found to be uncontaminated and it is reasonable to assume the remaining areas subject to fill and land disturbance will be of similar nature, a site management plan including an unexpected discovery protocol should be developed for the site. This is so appropriate steps are in place to detect unidentified buried material that may be hazardous to human health or the environment during earthworks. The document should also specify appropriate controls and steps to be taken in the event that hazardous material is exposed. The plan should pay particular attention to the areas that have been identified as historic fill / soil disturbance.
- Possible ACM fragments identified during the PSI walkover should be handpicked, double bagged and taken to an appropriate facility for disposal.

This report excludes any geotechnical considerations that could arise from the filling activities.

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Appendix A – Laboratory Results

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	WSP OPUS	**Lab No:**	2226073	SPv1
Contact:	Lance Robison C/- WSP OPUS PO Box 800 Whakatane 3158	**Date Received:** **Date Reported:** **Quote No:** **Order No:** **Client Reference:** **Submitted By:**	17-Aug-2019 26-Aug-2019 82748 Nukuhau Lance Robison	

Sample Type: Soil

Sample Name:		2 15-Aug-2019	4 15-Aug-2019	5 15-Aug-2019	7 15-Aug-2019	Shed 1 15-Aug-2019
Lab Number:		2226073.2	2226073.4	2226073.5	2226073.7	2226073.8
Individual Tests						
Dry Matter	g/100g as rcvd	80	75	80	74	78
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	2	< 2	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	0.15
Total Recoverable Chromium	mg/kg dry wt	4	< 2	< 2	3	< 2
Total Recoverable Copper	mg/kg dry wt	9	4	4	4	< 2
Total Recoverable Lead	mg/kg dry wt	10.1	9.1	13.2	2.8	6.4
Total Recoverable Nickel	mg/kg dry wt	4	< 2	< 2	< 2	< 2
Total Recoverable Zinc	mg/kg dry wt	31	22	17	10	174
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
alpha-BHC	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
beta-BHC	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
delta-BHC	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.04	< 0.04	< 0.05	< 0.04	< 0.04
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
4,4'-DDD	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
4,4'-DDE	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
2,4'-DDT	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
4,4'-DDT	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.08	< 0.15	< 0.08	< 0.08
Dieldrin	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Endosulfan I	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Endosulfan II	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Endrin	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Endrin ketone	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Heptachlor	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Methoxychlor	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013

Sample Type: Soil						
Sample Name:		2 15-Aug-2019	4 15-Aug-2019	5 15-Aug-2019	7 15-Aug-2019	Shed 1 15-Aug-2019
Lab Number:		2226073.2	2226073.4	2226073.5	2226073.7	2226073.8
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	< 0.4	< 0.6	< 0.4	0.8
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Acenaphthene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Anthracene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.018
Benzo[a]anthracene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.058
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.066
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	mg/kg dry wt	< 0.03	< 0.04	< 0.06	< 0.04	0.09
Benzo[a]pyrene Toxic Equivalence (TEF)	mg/kg dry wt	< 0.03	< 0.04	< 0.06	< 0.04	0.09
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.059
Benzo[e]pyrene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.038
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.044
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.022
Chrysene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.049
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Fluoranthene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.159
Fluorene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.044
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	< 0.13	< 0.07	< 0.07
Perylene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.016
Phenanthrene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.083
Pyrene	mg/kg dry wt	< 0.013	< 0.014	< 0.03	< 0.014	0.157

Sample Name:		Shed 2 15-Aug-2019	Shed 3 15-Aug-2019	Shed 4 15-Aug-2019	Shed 5 15-Aug-2019	Foundation 1 15-Aug-2019
Lab Number:		2226073.9	2226073.10	2226073.11	2226073.12	2226073.13
Individual Tests						
Dry Matter	g/100g as rcvd	96	64	66	66	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	5	12	6	7
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.35	0.22	0.28	< 0.10
Total Recoverable Chromium	mg/kg dry wt	< 2	6	3	3	8
Total Recoverable Copper	mg/kg dry wt	< 2	12	18	7	13
Total Recoverable Lead	mg/kg dry wt	4.1	97	16.6	12.6	17.2
Total Recoverable Nickel	mg/kg dry wt	< 2	3	< 2	< 2	6
Total Recoverable Zinc	mg/kg dry wt	38	129	182	200	82
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
alpha-BHC	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
beta-BHC	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
delta-BHC	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
cis-Chlordane	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
trans-Chlordane	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	< 0.04	< 0.04	< 0.04	< 0.04	-
2,4'-DDD	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
4,4'-DDD	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
2,4'-DDE	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
4,4'-DDE	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
2,4'-DDT	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
4,4'-DDT	mg/kg dry wt	< 0.010	0.017	< 0.015	< 0.015	-
Total DDT Isomers	mg/kg dry wt	< 0.06	< 0.10	< 0.09	< 0.09	-

Sample Type: Soil						
Sample Name:		Shed 2 15-Aug-2019	Shed 3 15-Aug-2019	Shed 4 15-Aug-2019	Shed 5 15-Aug-2019	Foundation 1 15-Aug-2019
Lab Number:		2226073.9	2226073.10	2226073.11	2226073.12	2226073.13
Organochlorine Pesticides Screening in Soil						
Dieldrin	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Endosulfan I	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Endosulfan II	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Endosulfan sulphate	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Endrin	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Endrin aldehyde	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Endrin ketone	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Heptachlor	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Heptachlor epoxide	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Hexachlorobenzene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Methoxychlor	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	< 0.4	< 0.4	< 0.4	-
1-Methylnaphthalene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
2-Methylnaphthalene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Acenaphthylene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Acenaphthene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Anthracene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Benzo[a]anthracene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	mg/kg dry wt	< 0.03	< 0.04	< 0.04	< 0.04	-
Benzo[a]pyrene Toxic Equivalence (TEF)	mg/kg dry wt	< 0.03	< 0.04	< 0.04	< 0.04	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.010	0.018	< 0.015	< 0.015	-
Benzo[e]pyrene	mg/kg dry wt	< 0.010	0.034	< 0.015	< 0.015	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010	0.050	< 0.015	< 0.015	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Chrysene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Fluoranthene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Fluorene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010	0.023	< 0.015	< 0.015	-
Naphthalene	mg/kg dry wt	< 0.05	< 0.08	< 0.08	< 0.08	-
Perylene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Phenanthrene	mg/kg dry wt	< 0.010	< 0.016	< 0.015	< 0.015	-
Pyrene	mg/kg dry wt	< 0.010	0.017	< 0.015	< 0.015	-

Sample Name:		Foundation 2 15-Aug-2019	Foundation 3 15-Aug-2019	Foundation 4 15-Aug-2019	Foundation 5 15-Aug-2019	Farm 1 15-Aug-2019
Lab Number:		2226073.14	2226073.15	2226073.16	2226073.17	2226073.18
Individual Tests						
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	-	0.45
pH*	pH Units	-	-	-	-	5.9
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	6	3	4	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.39	< 0.10	0.11	-
Total Recoverable Chromium	mg/kg dry wt	13	4	5	3	-
Total Recoverable Copper	mg/kg dry wt	16	10	15	5	-
Total Recoverable Lead	mg/kg dry wt	3.2	12.9	5.1	8.6	-
Total Recoverable Nickel	mg/kg dry wt	74	< 2	4	2	-
Total Recoverable Zinc	mg/kg dry wt	54	110	36	44	-

Sample Type: Soil						
Sample Name:		Farm 2 15-Aug-2019	Farm 3 15-Aug-2019			
Lab Number:		2226073.19	2226073.20			
Individual Tests						
Total Recoverable Cadmium	mg/kg dry wt	0.42	0.44	-	-	-
pH*	pH Units	5.8	5.6	-	-	-

Sample Type: Miscellaneous						
Sample Name:		1 15-Aug-2019	3 15-Aug-2019	6 15-Aug-2019		
Lab Number:		2226073.1	2226073.3	2226073.6		
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	< 5	< 2	< 4	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.3	< 0.10	< 0.2	-	-
Total Recoverable Chromium	mg/kg dry wt	< 5	2	< 4	-	-
Total Recoverable Copper	mg/kg dry wt	< 5	9	< 4	-	-
Total Recoverable Lead	mg/kg dry wt	1.0	7.3	< 0.8	-	-
Total Recoverable Nickel	mg/kg dry wt	< 5	< 2	< 4	-	-
Total Recoverable Zinc	mg/kg dry wt	9	23	< 8	-	-
Organochlorine Pesticides Screening in Rock						
Aldrin	mg/kg	< 0.02	< 0.02	< 0.02	-	-
alpha-BHC	mg/kg	< 0.02	< 0.02	< 0.02	-	-
beta-BHC	mg/kg	< 0.02	< 0.02	< 0.02	-	-
delta-BHC	mg/kg	< 0.02	< 0.02	< 0.02	-	-
gamma-BHC (Lindane)	mg/kg	< 0.02	< 0.02	< 0.02	-	-
cis-Chlordane	mg/kg	< 0.02	< 0.02	< 0.02	-	-
trans-Chlordane	mg/kg	< 0.02	< 0.02	< 0.02	-	-
2,4'-DDD	mg/kg	< 0.02	< 0.02	< 0.02	-	-
4,4'-DDD	mg/kg	< 0.02	< 0.02	< 0.02	-	-
2,4'-DDE	mg/kg	< 0.02	< 0.02	< 0.02	-	-
4,4'-DDE	mg/kg	< 0.02	< 0.02	< 0.02	-	-
2,4'-DDT	mg/kg	< 0.02	< 0.02	< 0.02	-	-
4,4'-DDT	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Dieldrin	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Endosulfan I	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Endosulfan II	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Endosulfan sulfate	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Endrin	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Endrin aldehyde	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Endrin ketone	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Heptachlor	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Heptachlor epoxide	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Hexachlorobenzene	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Methoxychlor	mg/kg	< 0.02	< 0.02	< 0.02	-	-
Total Chlordane [(cis+trans)*100/42]	mg/kg	< 0.04	< 0.04	< 0.04	-	-
Total DDT Isomers	mg/kg	< 0.12	< 0.12	< 0.12	-	-
Polycyclic Aromatic Hydrocarbons Screening in Rock						
1-Methylnaphthalene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
2-Methylnaphthalene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Acenaphthylene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Acenaphthene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Anthracene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Benzo[a]anthracene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Benzo[a]pyrene (BAP)	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg	< 0.05	< 0.05	< 0.05	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)	mg/kg	< 0.05	< 0.05	< 0.05	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Benzo[e]pyrene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Benzo[g,h,i]perylene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-

Sample Type: Miscellaneous						
Sample Name:		1 15-Aug-2019	3 15-Aug-2019	6 15-Aug-2019		
Lab Number:		2226073.1	2226073.3	2226073.6		
Polycyclic Aromatic Hydrocarbons Screening in Rock						
Benzo[k]fluoranthene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Chrysene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Dibenzo[a,h]anthracene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Fluoranthene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Fluorene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Naphthalene	mg/kg as rcvd	< 0.10	< 0.10	< 0.10	-	-
Perylene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Phenanthrene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Pyrene	mg/kg as rcvd	< 0.02	< 0.02	< 0.02	-	-
Total of Reported PAHs in Rocks	mg/kg as rcvd	< 0.5	< 0.5	< 0.5	-	-

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.
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**
Soil Prep Dry & Sieve for Agriculture	Air dried at 35°C and sieved, <2mm fraction.	-	18-20
Total of Reported PAHs in Soil	Sonication extraction, SPE cleanup, GC-MS SIM analysis.	0.3 mg/kg dry wt	2, 4-5, 7-12
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	2, 4-5, 7-17
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082). Tested on as recieved sample	0.010 - 0.06 mg/kg dry wt	2, 4-5, 7-12
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.002 - 0.3 mg/kg dry wt	2, 4-5, 7-12
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	2, 4-5, 7-12
Total Recoverable Cadmium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.10 mg/kg dry wt	18-20
pH*	1:2 (v/v) soil : water slurry followed by potentiometric determination of pH.	0.1 pH Units	18-20
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	2, 4-5, 7-12
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	2, 4-5, 7-12

Sample Type: Miscellaneous			
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%.	-	1-20
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, 3, 6, 18-20
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1, 3, 6

Sample Type: Miscellaneous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Polycyclic Aromatic Hydrocarbons Screening in Rock*	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	-	1, 3, 6
Total Recoverable digestion*	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1, 3, 6, 18-20

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

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

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

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

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

Certificate of Analysis

Client:	WSP OPUS	**Lab No:**	2226225	A2Pv1
Contact:	Lance Robison	**Date Received:**	17-Aug-2019	
	C/- WSP OPUS	**Date Reported:**	26-Aug-2019	
	PO Box 800	**Quote No:**	82748	
	Whakatane 3158	**Order No:**		
		Client Reference:	Nukuhau	
		Submitted By:	Lance Robison	

Sample Type: Soil

Sample Name	Lab Number	As Received Weight (g)	Dry Weight (g)	<2mm Subsample Weight (g ashed wt)	Asbestos Presence / Absence	Description of Asbestos Form
Foundation 1	2226225.1	105.8	91.2	45.2	Asbestos NOT detected.	-
Foundation 2	2226225.2	137.0	125.0	59.5	Asbestos NOT detected.	-
Foundation 3	2226225.3	108.4	72.7	57.8	Asbestos NOT detected.	-
Foundation 4	2226225.4	111.2	96.3	43.0	Asbestos NOT detected.	-
Foundation 5	2226225.5	106.4	72.8	55.8	Asbestos NOT detected.	-

Summary of Methods

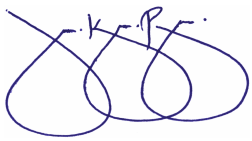
The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.
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
Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-5
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-5
<2mm Subsample Weight	Sample ashed at 400°C, weight of <2mm sample fraction taken for asbestos identification if less than entire fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	-	1-5
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1-5
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-5

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

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



John Keneth Paglingayen
Bachelor of Applied Science
Laboratory Technician - Asbestos

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Nukuhau Taupo Plan Change

Preliminary Site Investigation

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Document Details:

Date: March 2019
Reference: 2-37400.01 / 007CL
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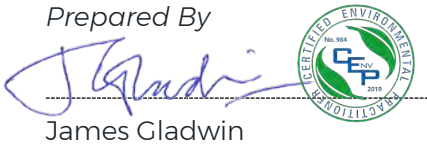
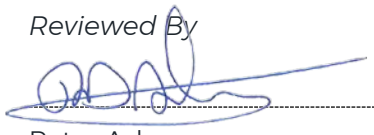
Prepared By



James Gladwin
Senior Environmental Scientist

Reviewed By



Peter Askey
Principal Environmental Engineer

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Document History and Status

Revision	Date	Author	Reviewed by	Approved by	Status
Issue 1	March 2019	JWG	PDA	HGC	

Revision Details

Revision	Details
Issue 1	

Executive Summary

This Preliminary Site Investigation (PSI) has been completed as part of a Structure Plan (SP) and application for a Private Plan Change (PPC) to Taupō District Council (TDC) to rezone areas of land in the Taupō District Plan (TDP) to enable residential development of up to 650 or more residential lots. The investigation is a desktop assessment is to investigate the likely presence of HAIL activities on the site and to provide recommendations as to further investigations that may be required to determine the contamination risks at the site.

This investigation and report has been completed in general accordance with the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) and the Ministry for the Environment Contaminated Land Management Guidelines No. 1 and No. 5.

From assessing the available information on the site and the findings of a site visit the following have been identified as possible HAIL activities and potential sources of contamination.

- Sawmill, possible fill activities, firewood and coal depot were located in Area 1. Possible wood treatment?
- Fill activities appeared to have extended north and south into Area 2 and Area 5 from Area 1.
- The areas of fill activity and land disturbance associated with the sawmill and firewood and coal depot activities in and around Area 1 have been identified by assessing historic aerial imagery have been provided in Appendix B.
- There is the potential for elevated cadmium levels in areas historically used for pasture, notably on area 3.
- Some small amounts of what appear to be ACM are present around the old house foundations in Area 3.
- Some fill activities (unrelated to the Sawmill) have occurred in Area 5 on a part of Lot 1 Deposited Plan 319886 (59 Watene Lane) and Lot 1 Deposited Plan South Auckland 91780 (63 Watene Lane).
- Glasshouse activities appear to be present in Area 5 on Lot 1 Deposited Plan South Auckland 31114 (65 Watene Lane).

This PSI has assessed the historic aerial imagery from 1945 to 2017, information from the TDC property files and HAIL Register and involved a site visit. As a result of this assessment, the following HAIL activities cannot be eliminated as occurring onsite without further investigation:

HAIL A18 - Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside in Area 1.

HAIL E5 – Coal or coke yards in Area 1.

HAIL G5 – Waste disposal to land in Areas 1, 2 and 5.

HAIL A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds in Area 5.

HAIL E1 - Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition in Area 3.

These HAIL areas have been outlined on Appendix B.

It is also likely that Area 3 has some elevation in the level of cadmium on pasture areas as a result of superphosphate application and although it is considered unlikely that cadmium levels on the site exceed the SCS of the NES some laboratory analysis would confirm this.

It is therefore advised that further investigations of the issues identified are completed in the form of a detailed site investigations to confirm the presence / absence of contamination and quantify the risk to human health by comparing the results of laboratory results against the relevant soil contaminant standards.

If investigations into the sawmill waste confirms the absence of timber treatment then the waste disposal to land in areas 1, 2 and 5 is unlikely to be a contamination issue.

This report excludes any geotechnical considerations that could arise from the filling activities.

1 Introduction

This Preliminary Site Investigation (PSI) has been completed as part of a Structure Plan (SP) and application for a Private Plan Change (PPC) to Taupō District Council (TDC) to rezone areas of land in the Taupō District Plan (TDP) to enable residential development of up to 650 or more residential lots. The PSI is a desktop assessment to investigate the likely presence of HAIL activities on the site and to provide recommendations as to further investigations that may be required to determine the contamination risks at the site.

This investigation and report has been completed in general accordance with the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) and the Ministry for the Environment Contaminated Land Management Guidelines No. 1 and No. 5.

2 Site Identification

As shown in Figure 1, the area of investigation was separated in to six areas each of which contained their own separate lots. Table 1 details the owner, land area, address appellation, CFR land status and interests for each area.

Table 1 - Site details

	Owner	Land Area (ha)	Address	Appellation	CFR	Land Status
1	Rajasingham Family Trust	9.0936	24 Acacia Bay Road and 27 Watene Lane	Rangatira 8A6B1 Block Māori Land Plan 22228	SA56B/732	General Land
2	Lexus Trustees 11 Limited	14.5540	48 Acacia Bay Road	Lot 2 DPS 86303	SA68B/415	General Land
3	CN Top Investment Limited	22.2778	6 Poihipi Road	Lot 2 DP 384060	336049	General Land
4	Taupō District Council	1.6890	Poihipi Road	(None)	(No CFR allocated)	General Land
5	Numerous	21.33	29 – 79 Watene Lane	Numerous	Numerous	General & Maori Freehold Land
6	Rangatira 8A17 Trust	15.00	200 Lakewood Drive	Numerous	Numerous	Māori Freehold, pending general

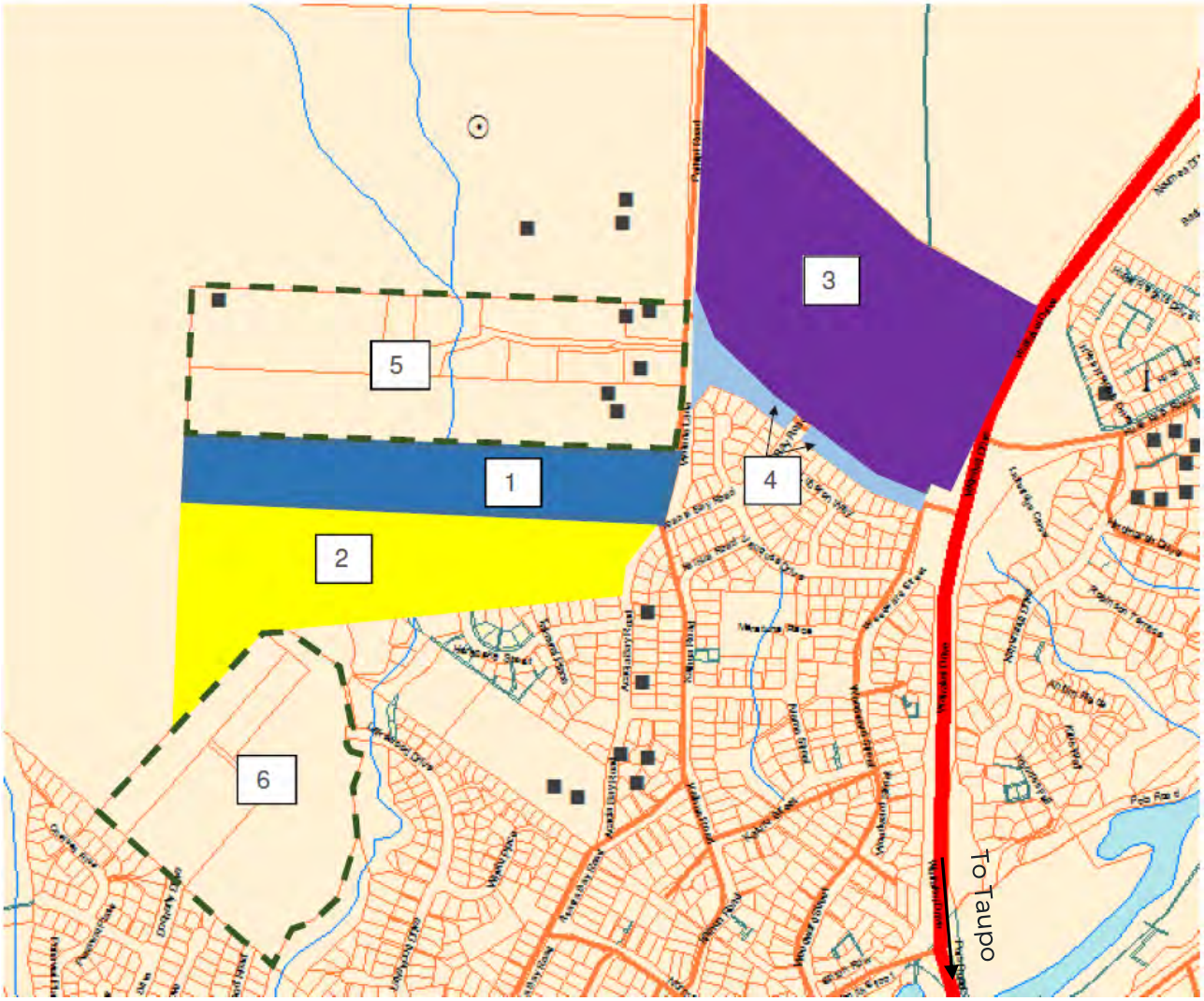


Figure 1 – Plan showing areas investigated

3 Site History

In order to determine the site history, a review of the following sources of information have been completed – Historic Aerials, Property Files and the Taupō District Council HAIL Register.

3.1 Historic Aerial Imagery

Historic Aerial imagery was reviewed from Retrolens, LINZ, Taupō District Council and Google Earth Imagery. The aerial imagery covered seven decades from 1945 to 2017. There was an 18-year gap in the imagery from 1946 to 1964 and a 12-year gap from 1985 to 1997. Due to licencing issues Google Earth Imagery cannot be reproduced in WSP OPUS reports. The six areas shown in Figure 1 were reviewed.

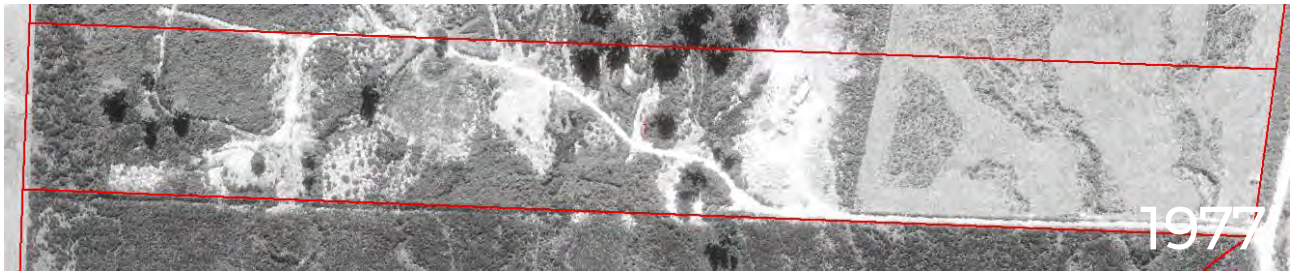
3.1.1 Site 1

1945 to 1967 – Scrub / Bush

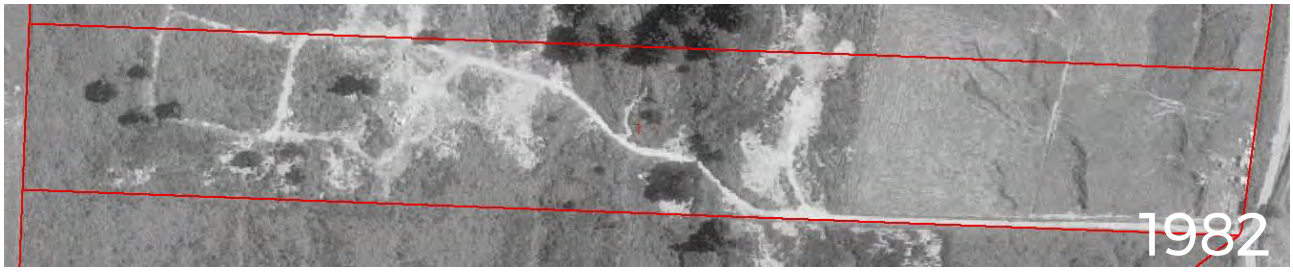
1971 – Fill Materials present plus building. Possible sawmill.

1975 – Road front appears to be pasture, rear of section appears to be forestry with some possible fill. Possible sawmill remains.

1977 – Road front appears to be pasture with some small buildings / structures on boundary, rear of section appears to be forestry with some possible fill. Possible sawmill remains.



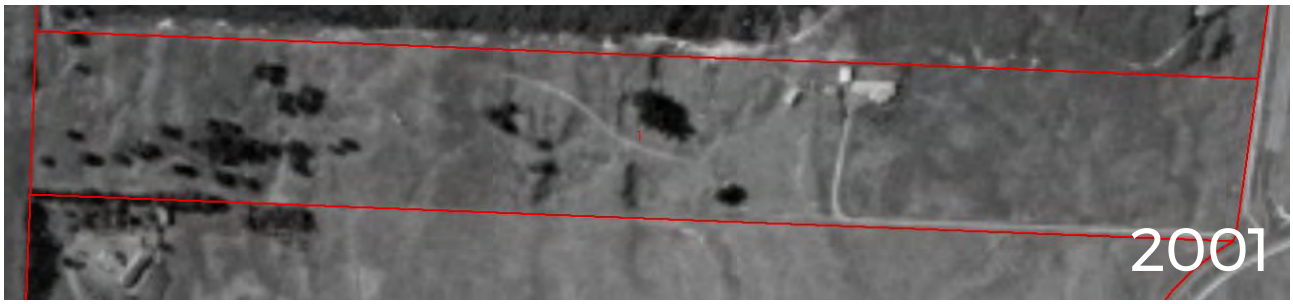
1982 and 1983 – Road front appears to be pasture with some small buildings / structures on boundary, forestry ceased with scrub/ bush regrowth from rear of section with some further possible fill. Possible sawmill remains.



1985 - Small buildings / structures on boundary removed, possible cessation of fill activities in what was possibly former forestry. Sawmill remains, logs clearly visible in property north.

1997 – Site mostly pasture. One residential property present in a location just east of possible sawmill. Sawmill appears to have ceased operation, but building is still present with some evidence of plant distress in the immediate surrounding area.

2001 – Site mostly pasture. Sawmill building still present.



2004 to 2017 – Site pasture with residential property. Sawmill building remains, no visible signs of plant distress or land disturbance.

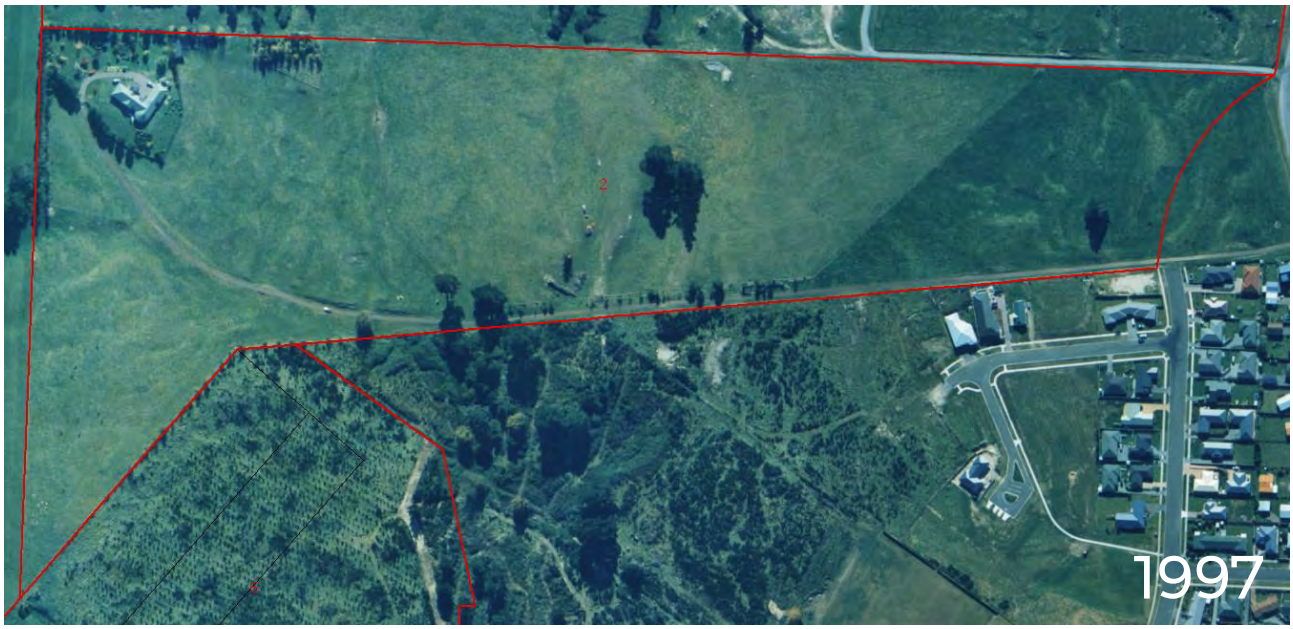
3.1.2 Site 2

1945 to 1977 – Scrub / Bush

1982 and 1983 – Scrub / Bush. Some possible fill or just land disturbance.

1985 – Scrub / Bush clearance. Some land disturbance in centre north of property from activities present in site 1.

1997 to 2016 - Site pasture. Residential property is present in the north-west.



2017 – Imagery from Google Earth. Land disturbance just east of the existing residential property, looks like landscaping and building platform for a new property.

3.1.3 Site 3

1945 to 1946 – Scrub / Bush

1964 to 1967 – Farm / Pasture

1971 – Farm / Pasture. Areas of land disturbance / machinery / unknown materials. Some storage sheds visible. Silage stacks present in centre north of the property.

1975 – Farm / Pasture / Cropping Areas of land disturbance reduced, but machinery / unknown materials still present on property. Silage stacks present in centre north of the property.

1977 to 1983 - Farm / Pasture / Cropping. Machinery / unknown materials still present on property. Silage stacks present in centre north of the property. There appears to be the beginnings of a horse exercise area in the 1983 imagery.

1985 - Farm / Pasture. Machinery / unknown materials reduced on property, couple of vehicles visible. Remains of silage stacks barely visible. What appears to be a horse exercise area is present.

1997 to 2004 – Site is farm / pasture with rural residential.

2007 to 2016 – Some storage sheds have been removed. Residential property has been demolished and foundations are visible.

2017 – Imagery from Google Earth. As 2016, foundation remains appear to have been tidied up, plus new storage shed just north of old residential property.

3.1.4 Site 4

1945 to 1946 – Scrub / Bush

1964 to 2017 – Road

3.1.5 Site 5

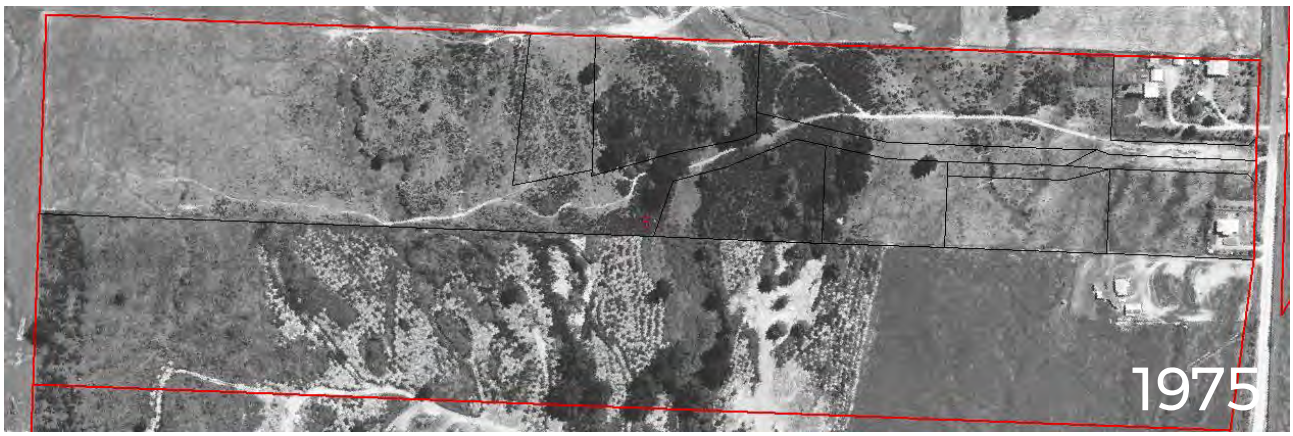
1945 to 1946 – Scrub / Bush

1964 – Scrub / Bush. Some minor land disturbance to the north-east corner.

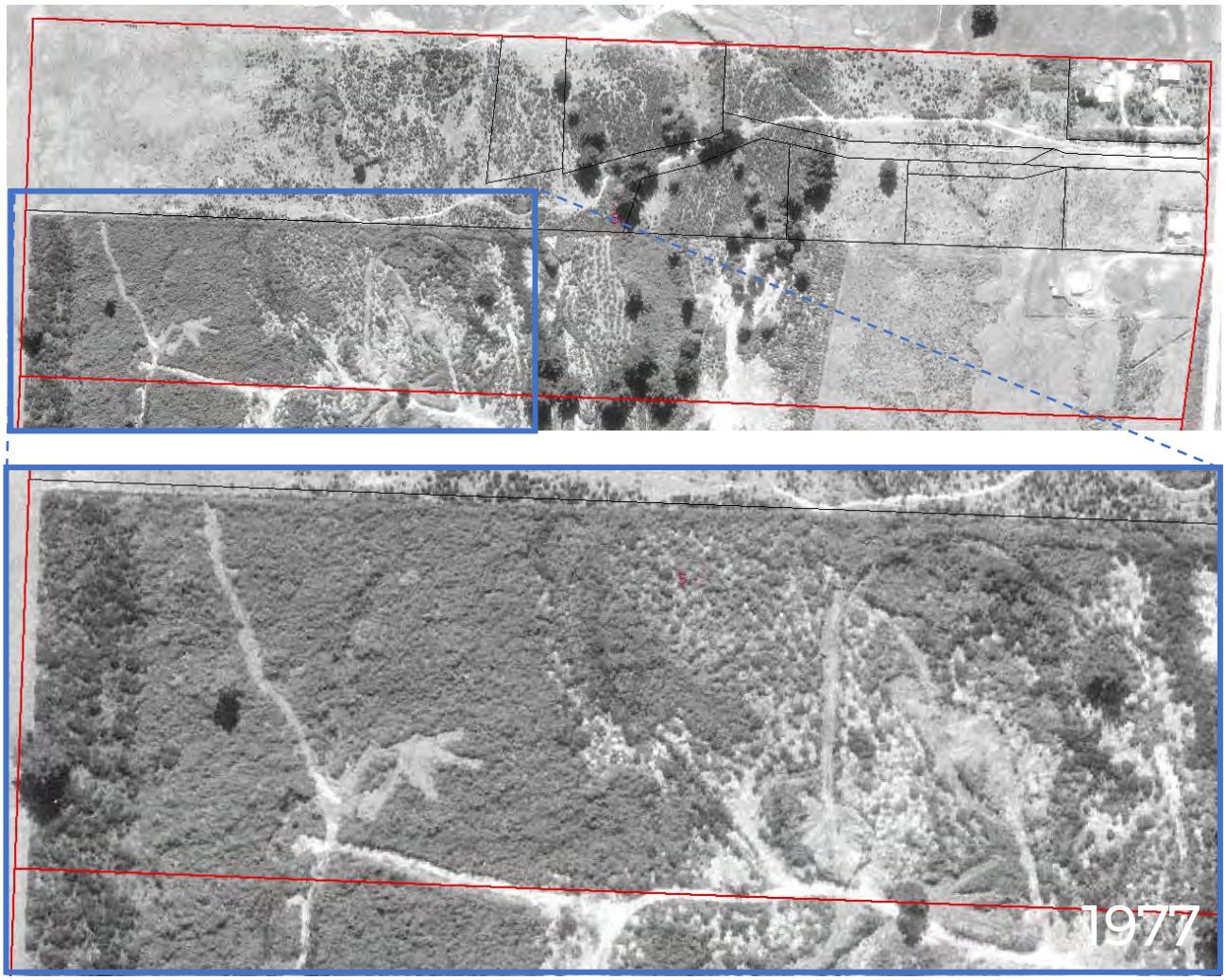
1967 - Scrub / Bush. Residential properties in the north-east corner.

1971 – Scrub / Bush. More residential properties in the north-east corner. Land disturbance as a result. Some land disturbance / fill as a result of activity from site 1 over spilling into property.

1975 – Residential to north-east corner. Forestry to south-west – overflow from site 1. Remainder scrub / pasture.

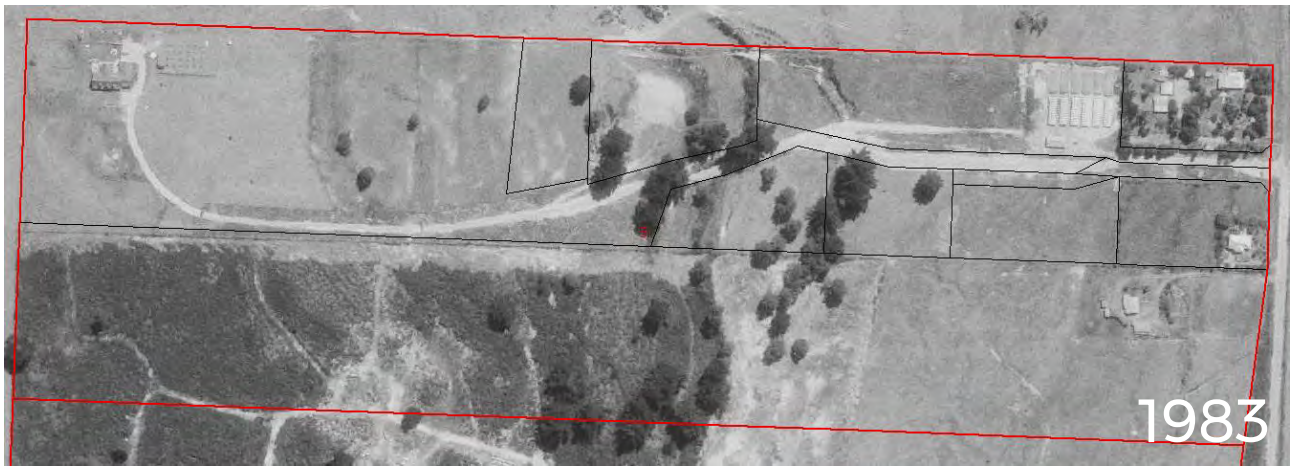


1977 – Residential to north-east corner. Forestry to south-west with some possible fill – overflow from site 1. Remainder scrub / pasture with scrub / bush regeneration in parts.



1982 - Residential to north-east corner, some further development underway. Property to the northwest. Bush / Scrub in northern half has been cleared to pasture, possible farm shed centre north of the property. Forestry to south-west appears to have ceased with scrub / bush regeneration and some possible old fill / unvegetated areas.

1983 - Residential to north-east corner, further development appears to be greenhouses. Property to the northwest, with small orchard. Remainder of northern half remains pasture, possible farm shed has been removed. Scrub / bush to south-west with land disturbance / fill activities from area 1 encroaching.



1985 - Residential to north-east corner, what appear to be greenhouses are still present. Property to the northwest, redevelopment over small orchard. Remainder of northern half remains pasture, with some land disturbance in the centre north and possible farm shed. Scrub / bush to south-west with land disturbance / fill activities from area 1 encroaching. Appears to be log storage in the centre south of the site.

1997 – Glass houses and residential visible to north-east, single residential property to north-west. Some land disturbance in centre of site just east of a new residential property, looks to be foundation work for new buildings. Area previously identified in 1985 as land disturbance has clearly been levelled and still has building to south of it. Southern half is mixture of scrub / bush and pasture.

2001 – Expansion of greenhouses to north-east, two more residential properties in the centre of the site. Land disturbance in the centre north is now re-grassed and possible farm shed remains. Southern half of site appears to have scrub / bush regeneration.

2004 – As 2001, but with additional residential properties (including one on previously levelled section). Some land disturbance towards the centre of the site.

2007 to 2012 – As 2004, but land disturbance areas have revegetated and scrub clearance to the south-west. Residential property to the west of the site removed in 2012 imagery.

2016 – Further residential development and associated land disturbance and fill / storage of materials in the centre north of the site. Southern half has scrub / bush regeneration.

2017 – Imagery from Google Earth. As 2016, but areas of land disturbance / fill / storage of materials have been tidied up.

3.1.6 Site 6

1945 to 1971 – Scrub / Bush

1975 – Scrub / Bush cleared into pasture.

1977 – Scrub / Bush regeneration on south-western half. North-eastern half is pasture or hay production.

1982 and 1983 – Scrub / Bush regenerating over old pasture / hay areas.

1985 – Scrub / Bush and some areas of pasture re-established.

1997 to 2008 – Mixture of scrub / bush and forestry.

2012 – Forestry has been harvested.

2016 – Scrub regenerating.

2017 – Imagery from Google Earth. Scrub cleared – grassed.

3.2 Property Files

The property files were requested by WSP Opus on 19 and 25 February 2019. The following sections detail the pertinent points contained in each of the property files. Note that some documents were duplicated across property files.

3.2.1 Site 1 – 24 Acacia Bay Road and 27 Watene Lane

February 1995 – Māori Land Court documents note dwelling on property since 1971. Property has been in ownership of Hinemoa Henderson, Huis Warbrick, Mauke Tuangaange Wiremu, Patiti Warbrick and Pohihipi Warbrick since at least 1959. The document has written statements from affected parties (Appendix A):

- It was noted by Nepia Williams that Mrs Henderson ran a sawmill across the gully and has used the area as a dumping ground for slabs and sawdust. The area was levelled using giant discs, but the development was not possible "because of the pollution and obstruction of the sawmill".
- It was noted by Rangi Aubrey that the gully area was "polluted" by Hinemoa and her husband.
- Mrs Henderson refuted claims that the area was polluted.

The court ordered that Rangatira be partitioned into Rangatira 8A6B1 and Rangatira 8A6B2.

February 1996 – communications regarding building consent for a new dwelling.

January 2009 – District Regulatory and Hearings Committee on Application for subdivision and landuse consent. Meeting covered planning issues, zoning of the land and issues regarding maximum permitted building coverage, encroachment of minimum building setbacks and rural "effects area" radius.

September 2017 – Residential building consent and associated plans and specifications.

3.2.2 Site 2 – 48 Acacia Bay Road

October 1987 – Plans for the "Lilburn House".

November 1999 – Subdivision plans of site for residential purposes.

3.2.3 Site 3 – 6 Poihipi Road

1992 - noted as "bull paddock" in undated engineering report

July 1996 - Consent notice re subdivision noting that the site is used for farming.

3.2.4 Site 4

No files.

3.2.5 Site 5 – 29-79 Watene Lane

29 Watene Lane

August 1968 – Change of use application – Taupō Firewood and Coal Supplies Depot at Pt Rangatira 8A6B. Refers to excavations, heaps, dumps, spoil and other materials likely to cause damage to property or disfigurement to the countryside shall be progressively restored. Plan also present showing location of sawmill site (Appendix A).

February 1995 – Māori Land Court documents note dwelling on property since 1971. Property has been in ownership of Hinemoa Henderson, Huis Warbrick, Mauke Tuangaange Wiremu, Patiti

Warbrick and Pohihipi Warbrick since at least 1959. The document has written statements from affected parties (Appendix A):

- It was noted by Nepia Williams that Mrs Henderson ran a sawmill across the gully and has used the area as a dumping ground for slabs and sawdust. The area was levelled using giant discs, but the development was not possible "because of the pollution and obstruction of the sawmill".
- It was noted by Rangi Aubrey that the gully area was polluted by Hinemoa and her husband.
- Mrs Henderson refuted claims that the area was polluted.

The court ordered that Rangatira be partitioned into Rangatira 8A6B1 and Rangatira 8A6B2

June 2002 – Annual warrant of fitness for a building. No reference to use and also issued in subsequent years up to 2006.

May 2004 – letter from owner re Building Warrant of Fitness - notes site has always been single residential dwelling.

August 2005 – Partition Proposal under the Māori Land Act regarding the construction of additional dwellings.

31 Watene Lane

January 1967 – Application for building permit to construct a private residence.

October 1967 – Computer Freehold Register with land status changing from Māori Freehold Land to General land. Mortgage to Westpac New Zealand Limited in 2010.

March 2001 – Annual Building Warrant of Fitness. No reference to use and also issued in subsequent years up to 2006.

April 2003 – Response from owner to Annual Building Warrant of Fitness indicates there is no building onsite.

October 2013 – PIM for building alterations (relocation of hall and new bathroom) describes property as rural and being constructed in the 1970s.

45 Watene Lane

October 1997 - Code of Compliance Certificate for workshop with facilities as a temporary dwelling.

June 2002 – PIM for new dwelling,

April 2011 – Swimming pool fencing plan showing residential property.

49 Watene Lane

December 1997 – PIM for a dwelling.

June 1999 – Code of Compliance Certificate for a dwelling.

55 Watene Lane

November 1995 – PIM for workshop with facilities as temporary dwelling.

October 1997 – Code of Compliance Certificate for new temporary dwelling with workshop facilities.

November 2016 – Application for Building Consent for extension to residential property.

March 2017 – Pre-floor building inspection for residential extension.

May 2017 – code of compliance for residential extension.

59 Watene Lane

March 2005 – various plans showing residential subdivision of Rangatira Block 8A6B.

May 2017 - PIM for fireplace installation for domestic property originally constructed in 1982.

July 2017 - Code of compliance for fireplace noting property constructed in 1980.

63 Watene Lane

October 1991 – Proposed site plan showing residential property. Equivalent to property observed on aerials.

May 2012 – Plan with existing house, exisiting shed and proposed shed with same layout as aerial imagery.

June 2012 – Audit report to construct a new car and boat shed with service pit.

October 2012 – Pictures of car and boat shed and Statement of Compliance.

Unknown Dates – Photos of residential property and sheds.

65 Watene Lane

February 1982 – plan showing shade houses and potting shed.

May 1987 – Plans for polydromes.

February 1994 – Technical specifications for a "Gro-House".

January 1995 – Code of compliance certificate for "Gro-House for use in Horticulture".

July 2001 – Building consent for extension to potting shed.

August 2003 – plan showing polydromes, shadehouses and potting shed.

April 2011 – Telecommunications Certificate of Compliance Request notes site has "glasshouse activities".

Date unknown – Photo 1 showing glasshouse activities.

Photo 1 - Image from property file (date unknown)

79 Watene Lane

January 1971 – Computer Freehold Register, land transferred from Māori Freehold Land to General Land.
April 1982 – establishment of bird gardens.
June 1995 – Code of Compliance Certificate for Dwelling
August 2017 – Building consent for residential property.
February 2018 – Pre-floor Building Inspection of extension to residential property.
April 2018 – Plumbing inspection for residential extension.

3.2.6 Site 6 – 200 Lakewood Drive

No files of note.

3.3 Taupō District Council HAIL Register

Taupō Distict Council were contacted on 19 February 2019 to check their Hazardous Activities and Industries List (HAIL) register. No HAIL activities were identified.

4 Geology and Hydrology

4.1 Soil and Geology

The S-Map Online Soils Map Viewer indicates that the site is located on Taupo Immature Orthic Pumice Soil. This soil is sandy loam in nature, well drained and has no significant barrier within 1 mbgl. The functional horizons are documented in Table 2.

Table 2 - Soil functional horizon for Taupo Immature Orthic Pumice Soil [1]

Functional Horizon	Thickness	Stones	Clay*	Sand*
Stony (lapilli) Sandy Weak, Acidic Tephric	10 - 15 cm	30 - 35 %	2 - 5 %	80 - 90 %
Stony (lapilli) Sandy Weak, Acidic Tephric	10 - 15 cm	30 - 35 %	2 - 5 %	80 - 90 %
Very Stony (lapilli) Sandy Loose, Acidic Tephric	70 - 80 cm	60 - 70 %	0 - 3 %	80 - 90 %

NZ 1:250k Geological Units are identified as predominately Holocene igneous rocks. Holocene igneous rocks are described as "primary, non-welded ignimbrite and reworked deposits from the 181 AD Taupo eruption; very low-density pumice". Subsidiary rocks are identified as pumice, ash, gravel, sand and silt.

4.2 Topography, Surface Water and Hydrogeology

The areas are located on rural land at an elevated position, between 410 and 450m above sea level and overlooks Lake Taupō (1.2km south) and the Taupō CBD (1.5km north-east). Residential land exists to the south of the areas with rural and farmland to the north. Stormwater from areas 1, 2, 5 and 6 either percolates into the pumice and ash soils of the region into the ignimbrite aquifers or flows overland eventually ending up in Lake Taupō. Stormwater from areas 3 and 4 will percolate into the pumice and ash soils of the region into the ignimbrite aquifers or flow overland and through Taupō District Council stormwater assets into the Waikato River.

Groundwater flows are documented by the Waikato Regional Council as following the general topology of the area towards Lake Taupō and the Waikato River.

The residential areas to the south are reticulated to the TDC water supply.

5 Site visit

A site visit was completed on 21 February 2019.

Site	Site Observations
1	Now used for cattle, there are some old concrete footings and bits of old timber present to the western end of the site. Site is quite undulating and weathered areas indicate that the material onsite in these locations is natural. One valley area which is adjacent to an old shed that may have been part of the old sawmill looks like it may have been filled.

[1] clay and sand percent values are for the mineral fines (excludes stones). Silt = 100 - (clay + sand)

Site	Site Observations

Concrete footings (left) and exposed natural ground (right)

Timber remains

Site	Site Observations
	 Possible filled gully adjacent to old shed  Inside old shed.
2	Property has a dwelling and equestrian facility. There is some storage of hay bales and firewood present. Area is undulating.

Site	Site Observations
	 Dwelling and equestrian facility.  Hay bales and firewood.
3	Foundation of what is presumed to be an old storage shed located as was the house. The old storage shed foundations have a new tin shed built on top of them. Some possible asbestos sheeting (asbestos containing material [ACM]) around the old house foundations. Remainder of the site was farmland with no obvious signs of contamination.

Site	Site Observations
	  Foundations of old shed with new tin shed (Left), Possible ACM around foundations of old house (Right).  House foundations
4	Site is a road.

Site	Site Observations
4	No longer present, now grassed
5	No access granted at time of the visit. Areas of interest were not visible from the roadside..
6	Site is now a field.

6 Basis for Guideline Values

Soil Contaminant Standards (SCSs) are not specifically required to assess the potential for current and historical HAIL activities. However, any further investigations should select SCS from "Table B2 – Soil Contaminant Standards for health (SCS (health)) for inorganic substances" and "Table B3 – Soil Contaminant Standards for health (SCSs (health)) for organic compounds" of the "User's Guide – National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. When there are no figures then a SCS should be selected from the Australian National Environmental Protection Measures (NEPM), which is consistent with CLMG 2 Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011).

Asbestos SCS for Fibrous Asbestos (FA), Asbestos Fines (AF) and Asbestos Containing Materials (ACM) should be sourced from The New Zealand Guidelines for Assessing and Managing Asbestos in Soil that hare published by BRANZ.

Hydrocarbon SCS should be sourced from the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (revised 2011).

It is anticipated that the "Rural residential / lifestyle block 25% produce" values are most suitable to assess the end risk of the site as these figures are considered most applicable for the end land use of residential development and should be used where specified.

7 Conceptual Site Model

The conceptual site model is used to support the decision-making process for contaminated land management.

The five basic activities associated with developing a conceptual site model are:

- Identification of potential contaminants;
- Identification and characterisation of the source(s) of contamination;
- Delineation of potential migration pathways through environmental media, such as groundwater, surface water, soils, sediment, biota, air, service lines;
- Identification and characterisation of potential receptors (human, ecological or building infrastructure);
- Determination of the limits of the study area or system boundaries.

For there to be an effect on receptors there must be a contamination source and a mechanism (pathway) for contamination to affect human health (receptor).

From assessing the available information on the site and the findings of a site visit the following have been identified as possible HAIL activities and potential sources of contamination.

- Sawmill, possible fill activities, firewood and coal depot were located in Area 1. Possible wood treatment?

- Fill activities appeared to have extended north and south into Area 2 and Area 5 from Area 1.
- The areas of fill activity and land disturbance associated with the sawmill and firewood and coal depot activities in and around Area 1 have been identified by assessing historic aerial imagery.
- There is the potential for elevated cadmium levels in areas historically used for pasture, notably on area 3.
- Some small amounts of what appear to be ACM are present around the old house foundations in Area 3.
- Some fill activities (unrelated to the Sawmill) have occurred in Area 5 on a part of Lot 1 Deposited Plan 319886 (59 Watene Lane) and Lot 1 Deposited Plan South Auckland 91780 (63 Watene Lane).
- Glasshouse activities appear to be present in Area 5 on Lot 1 Deposited Plan South Auckland 31114 (65 Watene Lane).

8 Site Characterisation

A plan of the possible HAIL activities has been provided in Appendix B.

The footprint of the sawmill, possible fill activities and land disturbance areas which were digitised from aerial imagery from 1945 to 2017 have been outlined in Appendix B. It is not known if the site had wood treatment facilities and neither is the precise location or scale of the coal depot documented on the property file. Possible fill and land disturbance activities extended beyond Area 1 north into Area 5 and south in Area 2. The property file included written statements noting the site had a sawmill across the gully and the area was used as a dumping ground for slabs and sawdust. It was noted that development was not possible "because of the pollution and obstruction of the sawmill".

It is likely that Area 3 has some elevation in the level of cadmium as a result of superphosphate application which is often used to promote pasture growth. Although it is considered unlikely that cadmium levels on the site exceed the SCS of the NES some laboratory analysis would confirm this. The area surrounding the old house foundations as shown in Appendix B does have some suspected ACM present, there was no documentation on the property files as to who removed the house and how it was completed. It is possible that Asbestos Fines (AF) and Fibrous Asbestos (FA) were released during demolition if not completed appropriately. The presence of suspected ACM materials onsite indicates that the house may not have been removed appropriately, laboratory analysis would confirm the presence of AF and FA in the soil.

The fill activities that were visible in the 2016 imagery and outlined in Appendix B are unrelated to the sawmill activities between 1971 and 1997 in Area 5. They are located on part of Lot 1 Deposited Plan 319886 (59 Watene Lane) and Lot 1 Deposited Plan South Auckland 91780 (63 Watene Lane) and could not be investigated further during the site visit as permission to access this site was not available.

Aerial imagery and the property file information has confirmed the presence of glasshouse activity in Area 5, specifically on Lot 1 Deposited Plan South Auckland 31114 (65 Watene Lane). The glasshouse activities have been outlined on Appendix B. This could not be investigated further during the site visit as permission to access this site was not available.

9 Conclusions and Recommendations

This PSI has assessed the historic aerial imagery from 1945 to 2017, information from the TDC property files and HAIL Register and involved a site visit. As a result of this assessment, the following HAIL activities cannot be eliminated as occurring onsite without further investigation:

HAIL A18 - Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside in Area 1.

HAIL E5 – Coal or coke yards in Area 1.

HAIL G5 – Waste disposal to land in Areas 1, 2 and 5.

HAIL A10 - Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds in Area 5.

HAIL E1 - Asbestos products manufacture or disposal including sites with buildings containing asbestos products known to be in a deteriorated condition in Area 3.

These HAIL areas have been outlined on Appendix B.

It is also likely that Area 3 has some elevation in the level of cadmium on pasture areas as a result of superphosphate application and although it is considered unlikely that cadmium levels on the site exceed the SCS of the NES some laboratory analysis would confirm this.

It is therefore advised that further investigations of the issues identified are completed in the form of a detailed site investigations to confirm the presence / absence of contamination and quantify the risk to human health by comparing the results of laboratory results against the relevant soil contaminant standards.

If investigations into the sawmill waste confirms the absence of timber treatment then the waste disposal to land in areas 1, 2 and 5 is unlikely to be a contamination issue.

This report excludes any geotechnical considerations that could arise from the filling activities.

10 References

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MfE. (2001 (Revised 2011)). *Contaminated Land Management Guidelines No. 1. Reporting on Contaminated Land Sites in New Zealand.* Wellington: Ministry for the Environment.

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Appendix A – Property File Excerpts from 24 Acacia Bay Road and 29 Watene Lane

The Registrar is ~~requested to forward a copy of this minute to the Secretaries~~ of the various Incorporations with a request ~~that~~ they send the appropriate share Transfer forms to the Archbishop for completion or consider resuming the respective shares ~~on behalf~~ of the shareholders.

Copy to Applicant.

74A **RANGATIRA 8A 6B** - s 173/53

Hinemoa Henderson - Applicant
Other owners as per Schedule

Notices of intention to appear and oppose filed by -

Tu Williams	0.0600 shares
Ranginui Aubrey	0.0200
Marutuna Froger	0.0200
Aorewa Dundas	0.0200
Tupu Mark Williams	0.0200

Letter from Diane Anne Hickman 0.1600
to oppose and authorising her uncle Nepia Williams to speak for her.

Hinemoa Henderson: Other owners per schedule on file also present.

In anticipation of this hearing I sent a notice of the application and the date of the hearing to all of the owners.

On the 3/4th May I sent out notice including a copy of the plan and the valuation to all of the owners.

Court: Has anyone here not received a copy of the plan?

Tupu Mark Williams: I have not - (provided with a copy by Mrs Henderson).

Mrs Henderson: The area of land I am seeking is the northern severance shown as Lot 1 and comprising 9.8514 ha created by drawing a line paralell with the northern and southern boundaries of the land.

My surveyor suggested that that manner of partition would ensure that none of the residue owners would be land locked.

Court: The valuation is dated the 30th April 1993 and may have been prepared prior to the partition plan.

The valuation produced establishes the value of Rangatira 8A6B at $253000, but gives no indication of the value of Lot 1 as sought by you nor of the residue area after Lot 1 is excised from the block.

That is a matter which must be addressed before any final decision can be made on the portion.

Mrs Henderson: I have administered this block over the years, and now as I am the biggest shareholder, and am being hampered in the use of the land. I believe we should be able to cut my share out now and leave the balance owners, of the one family to enjoy the land themselves.

I hold 0.5200 shares out of a total of 1.0000 share in the land.

Mr Tu Williams: This block should not be partitioned. Mrs Henderson talks of land for the other owners, but she has been exploiting the land since 1959.

When I was last in Court I vested my share amongst my family to make it more difficult to sell.

In 1959 her father called to see me. This block was amalgamated in 1992. We had to survey it to get it out.

I gave her father the money for survey. We were to have shared the costs, he gave me nothing. Part of the land was sold to the County for 2000 pounds. The solicitor said all the money went on costs.

They made an application for changing orders which was rejected.

We have had nothing for development and survey. If I had not settled on the land it would have been sold long ago. I wrote to the Registrar to explain the position, of sales made by Mrs Henderson's father.

Rangatira E is all in her father's name. He never thought of the other members of the family. 82B2 (Cherry Island) is taken all in his name, passing on to his daughter.

What have they done for the family over the years. I would like my family to be heard on this matter. They get their share by gift from me.

Mrs Henderson's father exploited all our families interests from our grandparents. He shared some with the Warbrick family who he called his brothers. Noting came to me even though I had equal rights. They all came from their grandmother. He always took the lands and did not allow us to succeed.

In 1959 he came to me for money to meet costs of survey. I paid Mr Dibble the full costs of the survey, and he never gave me anything by way of repayment.

Hinemoa Henderson takes all the revenue from the block.

She was leasing the block and using the revenue to pay the rates.

This is the only bit of land I can put a house on, all other lands been given to different members of the family.

I have been working on this since 1959. I have every right to say that the Registrar Harris Martin knows all about these matters.

I ask the Court to refuse the partition. She has been trying to have the land cut up so it can be sold.

She does not want the land, only wants to be able to sell it.

She gets enough money from Rangatira Incorporation. I have my house on Rangatira 8A6B and live in the house. The house was built in 1971 and I have been there all the time.

Mrs Henderson: The house occupied by Mr Williams is that shown in the north east corner of Lot 1 on the plan.

Mr Williams: I am staying in a house now and my grandchildren are living in the house.

Hinemoa says that the part we are living on should be hers, that includes my house - I object to that - she has no more right then I have to that portion of the block. Her father bought shares in the land, not any particular part of the land.

That is why I oppose the application.

Jane Warbrick: I object to any partition of these lands. First I have no objection to Tu Williams living his life out in the house, and secondly if the land is partitioned then the balance area will not be economic.

There is a big gully through the middle and the back is in gorse, only the front portion is capable of being used. The rear portion is not really capable of being developed.

Court; The valuer seems to hold that the area beyond the gully is undulating with good views of the lakes and mountains and has a potential for ..... development.

Mr Warbrick: It has been used as a dumping ground and is no use.

Nepia Williams: I am speaking on behalf of Diane Hickman in accordance with a letter referred to the Court.

My claim is that Mrs Henderson's father acquired vast shares for himself at the expense of other owners.

I had arguments with him over Cherry Island. Our great grandmother is on that Island, and there is an urupa there. They serve food over our ancestors bones.

On 8A6N, we use it and spray the land we use at the front. But Henderson has run a sawmill across the gully and has used the area as a dumping ground for slabs and sawdust.

As a result of this we could not stock the back area. We did giant disc it but could not continue our development because of the pollution and obstruction of the Sawmill.

I like the partition, but I am also moving towards the spirit of retention of land for our descendants.

Diane, has informed me that Mrs Henderson's father got from his mother 50 pounds and he got 50 pounds from my father for use on the land, but he used the money to buy shares for himself.

Ann Smith: I am an owner - I agree with everything my uncle has said, and with regard to the partition - I have no objection as long as the area remaining is a viable area for partitioning by the residue owners.

I would like to partition my own shares in time.

Rangi Aubrey: I am an owner having received shares from Tu Williams. I oppose the application. My mother and father both lived in the house on the land, and he developed the area in the front.

Hinemoa has no real claim to that area. She and her husband have polluted the gully area and that is the area she should have for partition.

I believe her father took some of our lands, she only wants it to sell it.

Mrs Henderson: I have listened to one of the fmily putting forward opposition to the proposal. Uncle Tu no longer lives on the land he is in a Rest Home his children or grandchildren live there. I had no objection to his living there.

There was a debt to my Uncle Tu, and I have all the receipts accounts etc between my father and Uncle Tu in the early days.

66 Taupo MB 43
Friday, 7 May 1993

My father who I am trying to protect from allegations made today was meticulous in his writing and I have it all. I am not sorry for what he did nor not do.

Uncle Tu said there is grazing money coming in, but I have sent balance sheets to all owners since 1982. I say Uncle Tu has been living rent free on the land for 20-30 years rate and rent free and this has expunged any debts due to him.

I believe his application to the Council to put the two houses on the land was made without my knowledge under my name as the biggest owner.

I have a letter to all my uncles, showing how my grandmother's lands were distributed, no justification for the claims being made against my father.

Being the biggest shareholder - I would not pollute the block as this would be contrary to my own interests as the biggest owner. I have the most to lose by any such pollution.

The back portion of the block is very good and capable of development.

I want to build a house on the land. I do not wish to sell the land. I feel I should be able to proceed with my partition.

Nepia says my father was greedy, but he died with nothing. I have his shares I do not have a section to build a house on. If my cousins and uncles want to see the consolidation between the 5 brothers on succession to my grandmother. I also have the receipts, statements between my father and Uncle Tu.

Tu Williams: She acquired her share in the land to give her the largest interest, by gift from Poihipi Warbrick under sec 213/53 in 1973. Poihipi's interest should have been shared amongst the whole family.

Mrs Henderson: In response to the Court. The northern severance where the William's house was selected by me because Uncle Tu has said that was the area purchased by my father and left to me.

If I had taken the southern severance the residue land would be landlocked. I agree that there is access to the back of Lot 1 off the road. I was concerned that the other owners would be landlocked if I took Lot 2.

The access to the rear of Lot 1 would prove difficult.

Mr Nepia Williams: I know the land, and although a little foundation work would be required to provide access to the rear of the land, and stay within the bounds of Lot 1.

Court: To Mrs Henderson. The Court is concerned that on your own admission Mr Tu Williams and his family have occupied the front portion of the proposed Lot 1 for the past 20-30 years, yet you are now endeavouring to take that area from the families use.

Would you consider a portion on the southern side?

Mrs Henderson: I could do, since in my opinion the whole block is of the same value.

If the value of Lot 2 is not appreciably lower than Lot 1 then I could be prepared to accept that in full settlement of my shares even though it may prove to be less than my entitlement.

I do not believe that the Williams family should be allowed to continue to use the land without payment of rates.

I am of the opinion that only one family is causing the opposition.

Court: after discussion it is fact that some of the Williams family would approve of Lot 2 going to Mrs Henderson others oppose partition.

P A Warbrick - Supports partition.
K P Warbrick - Supports partition.

Mr Nepia Williams: We have discussed this amongst ourselves and we Mrs Froger, Mrs Dundas, Mrs Aubrey as owners all agree to a partition order in favour of Mrs Hinemoa Henderson provided she take the Lot 2 severance of 9.0936 ha portion in full settlement of her shares.

Mrs Henderson: I agree to that.

Court: The Court is satisfied that partition is appropriate in this instance and that orders can be made by consent. The owners are all of the same Hapu and Local Authority consent is not required.

Accordingly by consent.

Ordersection 173/53 partitioning Rangatira 8A6B into -

1 9.0936 ha more or less to be Rangatira 8A6B1 or such other appellation as the Chief Surveyor shall approve to vest in Hinemoa Henderson in full satisfaction of her shares in the block.

2 9.8514 ha more or less to be known as Rangatira 8A6B2 to vest in the balance owners in their respective shares.

In terms of sec 432A/53 the severances created are to be inalienable other than in accordance with the provisions of the Maori Affairs Act 1953.

In terms of sec 34(8A) the above orders are subject to the applicant completing the partition as to survey within 12 months of the date hereof.

Copy to Mrs Henderson.

~~90~~ ~~TAUHARA MIDDLE 4A1D2~~ - s 173/53

Court: This application has been before the Court on a number of occasions since 3 December 1991.

At the last hearing on 4 February 1993 the application was further adjourned to enable the applicant to provide a fresh plan in a different location and of lesser area and which might accord his shareholding.

The original application showed that Mr Wall held 0.47049 out of a total of 7.9787 shares in the block.

On the basis of the valuation filed the applicant's shares wee valued at $5050 whilst the severance he was seeking to ..... from the land was valued at $45000.

Since then Mr Wall has acquired further shares and now holds a total of 1.04687 shares valued at $11,153, still considerably below the value required to portion the area shown on the plan.

There is no appearance by Mr Wall today nor have any amended plans or valuations been filed.

The application is dismissed with leave to Mr Wall to apply for reinstatement without further fee within 6 months of the date hereof.

~~Copy to Applicant.~~

Judge

66 TAUPO MINUTE BOOK 214

At Rotorua - Monday, 5 November 1994

Present - H K Hingston, Judge
- F L Tamati, Clerk

U/A 37293 RANGATIRA 8A6B - s 173/53

Miss D M Page for Registrar: At 66 Taupo MB 39-45 of 7 May 1993 the Court made orders partitioning Rangatira 8A6B into Rangatira 8A6B1 of 9.0936 ha and Rangatira 8A6B2 of 9.8514 ha subject to survey within 12 months of that date. Survey was requisitioned in June 1993 but there was a holdup because a small area 1889.4 m2 was to be gazetted as road. The gazettal has now been completed N.Z Gazette 20 October 1994 No.108 p3160.

ML 22228 has now been presented and I therefore ask for final orders in terms of 66 Taupo MB 39-45 of 7 May 1993. Order Section 34(10)/53 for immediate release.

Court: Orders accordingly.

Judge

0750 29

T3/6/73

29 Waterena Lane

CHANGE OF USE APPLICATION

TAUPO FIREWOOD & COAL SUPPLIES : DEPOT - POIHIPI ROAD

1. Location: See attached map

2. Statutory:
   - (i) Application Date - No dated approx. August 1968
   - (ii) Public Notification - 22nd & 29th August 1968
   - (iii) Objections closed - 20th September 1968
   - (iv) Statutory Declaration - 20th September 1968
   - (v) Decision - 8th October 1968
   - (vi) Appeal - Nil

3. Objections: Nil

4. Resolution: "THAT COUNCIL CONSENT TO THE PROPOSED CHANGE OF USE OF A FIVE ACRE PORTION OF PT. RANGATIRA 8A6B AS SHOWN ON T.C.C. PLAN G201 THE DURATION OF THE CONSENT TO BE FOUR YEARS FROM 8/10/68 AND SUBJECT TO THE FOLLOWING CONDITIONS -

   (1) That the applicant make provision for the storage of 2,000 gallons of water for emergency fire fighting purposes;-

   (2) That Council may extend the period of this consent as it sees fit provided the applicant applies for an extension in writing before the expiry of the current consent (ie. 4 years from 8.10.68).

   (3) That all tailings, sawdust, spoil waste and effluent shall be so disposed of as to minimise damage to property or disfigurement of the countryside.

   (4) That the sites of excavations, heaps, dumps, spoil or other materials at any working or plant which cause or are likely to cause damage to property or disfigurement to the countryside shall be progressively restored to a reasonably natural state by levelling or backfilling where possible and by the planting of grass or trees, and on completion of work by the removal of plant and buildings.

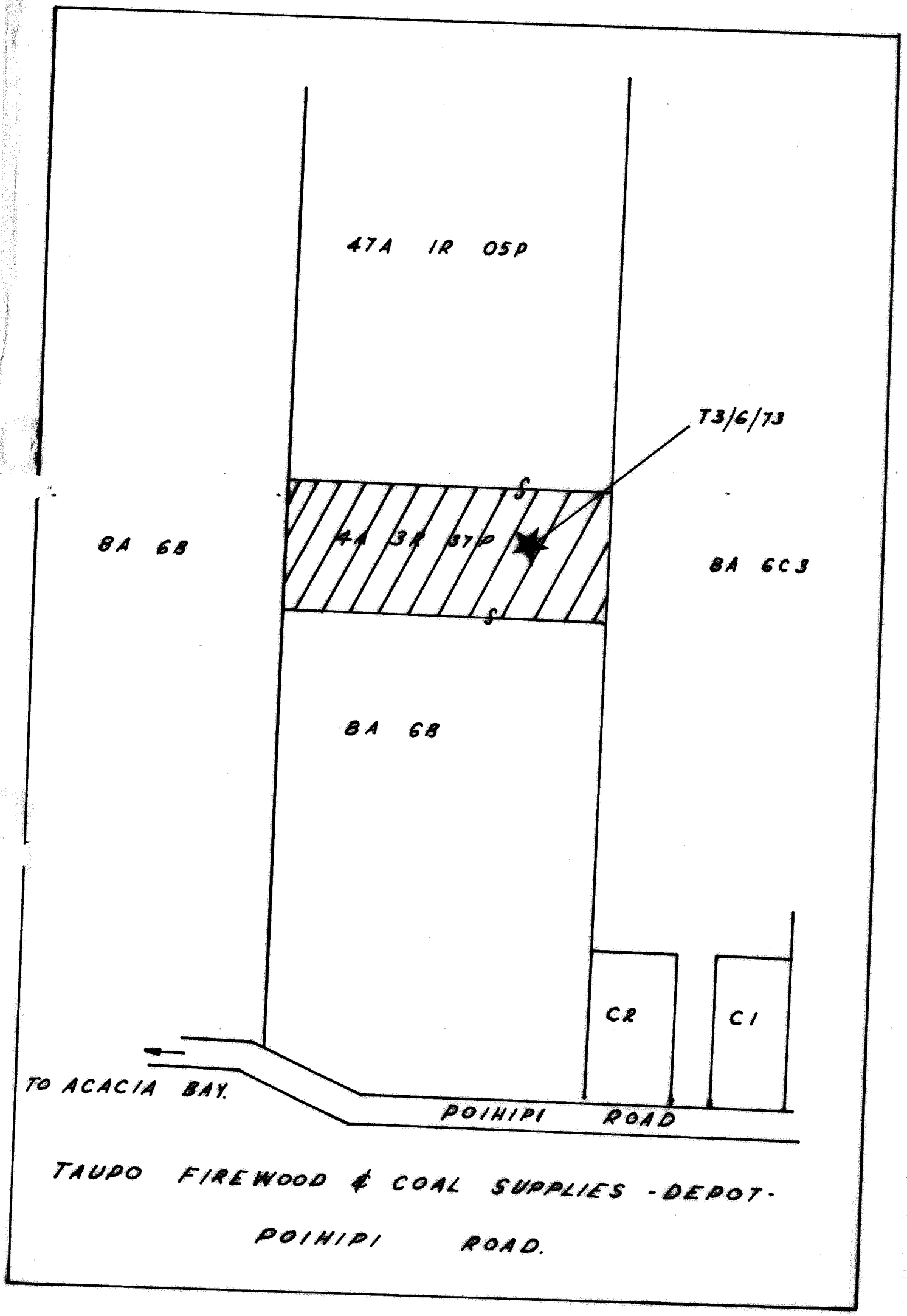
   (5) Fees incidental to the hearing of this application to be $5.

THIS IS A TRUE AND CORRECT RECORD OF COUNCIL'S RESOLUTION:

COUNCILLORS AND INHABITANTS OF THE COUNTY OF TAUPO
THE Common Seal OF
THE CHAIRMAN

.....

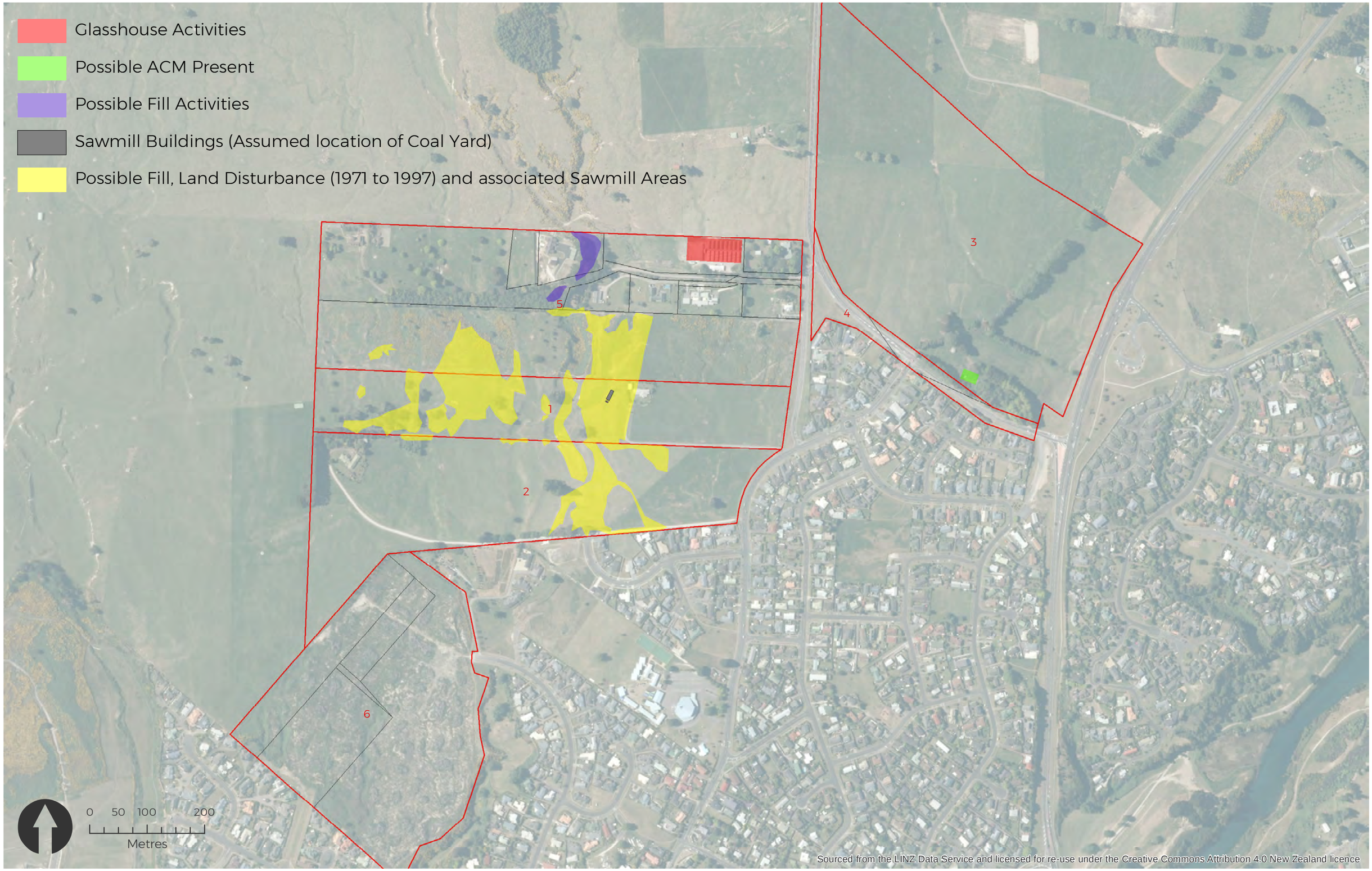
C.J. COATES
COUNTY CLERK



TAUPO FIREWOOD & COAL SUPPLIES - DEPOT -

POIHIPI ROAD.

Appendix B – Possible HAIL Activities



Nukuhau Taupo Plan Change - Possible HAIL Activities

Prepared by: wkjwg0 Approved by: wkpda0

Aerial Imagery data obtained from LINZ and LiDAR sourced from BOPRC under Creative Commons Attribution 3.0 New Zealand Licence. Parcel boundaries are to be taken as approximate only.

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07 March 2019

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