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**MEMORANDUM**

Date: 12 August 2025
From: Sean Finnigan/Elliot Bish
Subject: Former Tokanui Psychiatric Hospital – Additional Structures Memo (V2)
To: Bryan Daly; bdaly@linz.govt.nz

Job no: 33205

Dear Bryan,

At your request, Fraser Thomas Limited (FTL) has conducted limited sampling and analysis of soils near one existing structure and former feature within the grounds of the former Tokanui Psychiatric Hospital, Te Awamutu (Section 1 SO 44852) ('the site'). The structure was identified as a toilet block, while the feature was identified as a former bowling green. The toilet block is on the northern side of Building 23, surrounded by dense vegetation, while the former bowling green feature is located east of Building 3. The purpose of this assessment was to determine the contamination levels within soils around these structures, which had not been identified or surveyed in previous site investigations due to the dense vegetation and lack of landmarks that made recognition of these features difficult.

Given the identification of the historical bowling green and toilet block on site, potential 'Hazardous Activities and Industries List' (HAIL) activities A10 (*Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds*), and I (*Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment*) may have affected the soils in these areas of the site. Hence, intrusive soil sampling was undertaken, focusing on the potential presence of heavy metals, organochlorine pesticides (OCPs) and asbestos in soil, to check for possible contamination derived from potential historical application of persistent pesticides to the bowling green, and historical use of potentially asbestos containing materials (PACMs) and/or historical application of lead paint in construction of the toilet block structure, now in an aged and deteriorated condition.

This investigation has been undertaken in general accordance with the requirements of the Ministry for the Environment 'Contaminated Land Management Guidelines No.5' (CLMG5) for site investigations and analysis of soils with contamination of this nature based on a feature-based soil sampling approach. Furthermore, this investigation has been managed, reviewed and approved by a Suitably Qualified and Experienced Practitioner (SQEP), as defined in the National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES:CS).

1.0 SITE LOCATION AND BACKGROUND

The former Tokanui Psychiatric Hospital site is approximately 80 hectares (ha) in area and is located roughly 14 km southeast of Te Awamutu, Waikato. The site was developed in 1912 and operated through to 1998. The site contains several significant pieces of infrastructure, including 76 buildings, a

wastewater pump station, a swimming pool, eight substations, a closed landfill, and substantial roading and underground infrastructure and services.

Prior to preparation of this memorandum, several earlier contamination investigations were undertaken with relation to the Tokanui Psychiatric Hospital site structures, including:

- Preliminary Site Investigation (PSI) dated 7th September 2018 and prepared by AECOM, which reviewed an earlier PSI undertaken by Opus International Consultants (Opus) to identify gaps in their investigation that may have led to potentially contaminating historical activities and/or features present on site that were not initially identified;
- Detailed Site Investigation (DSI) dated 9th August 2019 and prepared by AECOM, which assessed the soil contaminant conditions at the site and the associated risk to human health and the environment for a proposed future agricultural land use;
- Asbestos and Lead Paint Demolition Survey Reports dated December 2022 and prepared by 4Sight Consulting (now SLR Consulting), which identified asbestos within the structures/workplaces so that it could be removed safely before commencement of the demolition process, and identified lead paint within the structures/workplaces for waste characterisation and handling purposes;
- PSI dated 6th October 2023 and prepared by GHD Limited (GHD), which reviewed existing reports to identify and close any data gaps, identified HAIL activities and potential sources of contamination for the proposed change of land use from a commercial/industrial hospital site to a grassed site with no buildings, refined the conceptual site model developed by AECOM (2019) to reflect the findings from the PSI, and informed the sampling plan for the future GHD DSI;
- DSI Factual Report dated 19th January 2024 and prepared by GHD, which assessed the soil contaminant conditions at the site and the associated risk to human health and the environment so that these would be known before commencement of the demolition and remediation work, and supported resource consent(s) application(s) for ground disturbance activities associated with the demolition and remediation works;
- Remedial Action Plan (RAP) dated 7th April 2025 and prepared by FTL, which provided the remedial requirements for the demolition and remediation of the former Tokanui Hospital site; and
- The FTL Demolition, Deconstruction and Remediation Management Plan (DDRMP), which outlined requirements for the proposed demolition works, and reviewed material compositions of the above-ground infrastructure on site related to structures where demolition is proposed.

The additional structures, namely the historical bowling green and toilet block, which were not surveyed or sampled in previous investigations of site infrastructure, are located within the north-east portion of the site (see Figure 1 attached to the report). The objective of this assessment was to determine the contamination status of soils within and surrounding these additional structures, which were not visually identified during the previous investigations listed above.

2.0 SITE WALKOVER

To date, two site visits have been undertaken by FTL Environmental Scientists Elliot Bish and Ben Laing-McConnell on the 13th May 2025 and 13th June 2025, which have involved limited sampling of soils within and surrounding the additional site structures. The site was accessed via the main entrance off Te Mawhai Road. The toilet block and bowling green were accessed by following the Tokanui Hospital Road network towards the north-east portion of the site.

The toilet block was observed as a small building hidden within a stand of trees and other vegetation. The structure appeared to be constructed on a concrete base, with a mixture of concrete (lower half) and wooden cladding (upper half), PACM soffits and ceiling panels, with a metal roof. Most materials comprising the toilet block building appeared in an aged but relatively good condition overall. However, the roof and paint coat showed signs of deterioration, while the downpipes had deteriorated completely.

Additionally, a concrete pavement surrounded the base of the toilet block building, with variable extents and conditions at each façade. A small metal fence was also observed adjacent to the southern façade of the toilet block, and another fence comprised of wooden posts and a railing with a metal chain-link was observed along the western façade.

The bowling green was observed as a grassed paddock, with no clear visual signs of the historical feature present, except for some slightly variable topography at the northern boundary of this area.

No other signs of potential contamination were observed during the site walkover of the bowling green and toilet block areas. Site photos have been included as Appendix A.

3.0 SOIL SAMPLING

3.1 Data Quality Objectives & Conceptual Site Model

In accordance with CLMG5, Data Quality Objectives (DQOs) and Conceptual Site Model (CSM) for this investigation are summarized in Table 1.

Table 1: DQOs and CSM

Purpose of Investigation	Assess human health risks associated with soils located in proximity to previously unsurveyed historical site structures within the Tokanui Psychiatric Hospital grounds	
Define boundaries	Investigation focused on soils within the halo of the historical toilet block and soils within the footprint of the historical bowling green on site.	
Develop Conceptual Site Model	Known/possible HAIL land use	<i>HAIL A10: Persistent pesticide bulk storage or use, including sport turfs, market gardens, orchards, glasshouses, or spray sheds.</i> <i>HAIL I: Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment</i>
	Contaminants of concern	Heavy metals, polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), and asbestos
	Distribution of contaminants	Lateral – across the site Vertical – depending on the soil type
	Receptors	Site users (long term), Contractors (short term)

	Potential pathways	Dermal contact, ingestion and inhalation.
	Applicable land use scenario	Commercial/Industrial land use (outdoor worker), and Site-Specific Remedial Standards – Rural-Residential and Managed Recreational

3.2 Evaluation Basis

The sampling results have been compared with:

- Waikato Regional Council upper limit background concentrations for selected elements in soil;
- NES: CS Soil Contaminant Standards (SCS) for Commercial/Industrial land use (outdoor worker);
- Site-Specific Remedial Standards (SSRS) as presented in HAIL Environmental Limited Site-Specific Risk Assessment Report version 3.2, dated February 2024; and
- BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil (2017).

3.3 Methodology

Intrusive sampling of soils located within the footprint of the bowling green and adjacent to the toilet block was undertaken across 2 site visits on the 13th May 2025 and 13th June 2025. A total of 8 boreholes were put down across 8 locations using a 50mm hand auger, with 4 locations located in proximity to each of the additional structures on site. The methodology of sampling and analysis of these features was as follows:

- On the 13th May 2025, 4 samples were collected from 4 locations at a single depth (0-0.15m) from soils within the historical bowling green footprint. Following this, on the 13th June 2025, 12 deeper samples were collected from the original 4 locations at 3 additional depths (0.15-0.3m, 0.3-0.5m & 0.5-0.7m). All 16 individual samples collected from the footprint of the bowling green were analysed for heavy metals, mercury, and OCPs, and a single sample (BG03 0.3-0.5m) was also analysed for PAHs, due to the identification of minor fill. Sample locations are shown in Figure 2.
- On the 13th May 2025, 8 soil samples were collected from 4 locations at 2 depths (0-0.15m & 0.15-0.3m) from soils at the edge of the paving surrounding each façade of the toilet block structure on site. The initial 8 individual samples collected from shallow soils within the halo of the toilet block were analysed for heavy metals and semi-quantitative asbestos in soils. Following this, on the 13th June 2025, 8 deeper samples were collected from the original 4 locations at 2 additional depths (0.3-0.5m & 0.5-0.7m). Based on the results of initial analysis, the 8 deeper samples collected during the June 2025 site visit were analysed for heavy metals. Sample locations are shown in Figure 2-1.

These samples are representative of the soil that might have been impacted by HAIL activities A10 & I and which are likely to be disturbed during the proposed works. The sample breakdown is shown in Table 2 below.

Table 2: Soil Samples Breakdown

Sample ID	Depth (m)	Soil	Test
BG01-BG04	0-0.15m	Topsoil with minor rootlets	Heavy Metals, Mercury & OCPs
	0.15-0.3m	Clayey Silt (Light Brown/Orange) with minor topsoil	
BG01, BG02 & BG04	0.3-0.5m		
BG01-BG04	0.5-0.7m		
BG03	0.3-0.5m	Clayey Silt (Light Brown/Orange), minor topsoil & some fill (black – potentially burned material)	Heavy Metals, Mercury, OCPs & PAHs
TBN 0.5 A	0-0.15m	Topsoil with rootlets & minor organic litter (leaves, bark)	Heavy metals & Semi-Quantitative Asbestos in soil
TBN 0.5 B	0.15-0.3m	Topsoil with minor silty clay & rootlets	
TBN 0.5 C	0.3-0.5m	Clay (Yellow/light brown)	Heavy Metals
TBN 0.5 D	0.5-0.7m		
TBE 0.5 A	0-0.15m	Topsoil with rootlets & minor organic litter (leaves, bark)	Heavy metals & Semi-Quantitative Asbestos in soil
TBE 0.5 B	0.15-0.3m	Topsoil with minor silty clay & rootlets	
TBE 0.5 C	0.3-0.5m	Clay (Yellow/light brown)	Heavy Metals
TBE 0.5 D	0.5-0.7m		
TBS 0.5 A	0-0.15m	Topsoil with rootlets & minor organic litter (leaves, bark)	Heavy metals & Semi-Quantitative Asbestos in soil
TBS 0.5 B	0.15-0.3m	Topsoil with minor silty clay & rootlets	
TBS 0.5 C	0.3-0.5m	Clay (Yellow/light brown)	Heavy Metals
TBS 0.5 D	0.5-0.7m		
TBW 0.5 A	0-0.15m	Topsoil with rootlets & minor organic litter (leaves, bark)	Heavy metals & Semi-Quantitative Asbestos in soil
TBW 0.5 B	0.15-0.3m	Topsoil with minor silty clay & rootlets	
TBW 0.5 C	0.3-0.5m	Clay (Yellow/light brown)	Heavy Metals
TBW 0.5 D	0.5-0.7m		

3.4 RESULTS SUMMARY

The soil sampling results are summarised in Table 3 below. The laboratory certificates are shown in Appendix B.

Former Tokanui Psychiatric Hospital - Toilet Block: Soil Results

Former Tokanui Psychiatric Hospital - Toilet Block: Soil Results																	
Sample Date	Background Concentrations ¹	NESCS commercial/ industrial outdoor worker (unpaved) ²	Site Specific Remedial Standards - Rural Residential ³	Site Specific Remedial Standards - Managed ³	Waste Acceptance Criteria			13-May-25		13-Jun-25		13-May-25		13-Jun-25			
Sample Name								TBE 0.5 A	TBE 0.5 B	TBE 0.5 C	TBE 0.5 D	TBW 0.5 A	TBW 0.5 B	TBW 0.5 C	TBW 0.5 D		
Sample Depth (m)					0-0.15m	0.15-0.3m	0.3-0.5m	0.5-0.7m	0-0.15m	0.15-0.3m	0.3-0.5m	0.5-0.7m					
Lab Number					3892810.30	3892810.31	3916050.50	3916050.60	3892810.32	3892810.33	3916050.30	3916050.40					
Heavy Metals																	
(mg/kg dry weight)	95% upper limit for background (mg/kg)																
Arsenic	6.8	70	9	70	17	70	100	4	3	4	8	16	5	4	3		
Cadmium	0.22	1,300	0.9	10	0.8	1.2	20	0.27	< 0.10	0.17	< 0.10	0.42	0.26	< 0.10	< 0.10		
Chromium	30	6,300	150	150	56	362	100	9	8	7	6	13	8	9	9		
Copper	25	>10,000	280	280	120	107	200	18	14	16	9	31	12	16	13		
Lead	20	3,300	120	460	78	210	200	33	17.7	24	11.7	250	48	22	19.1		
Nickel	7.6	6,000	-	-	33	320	200	4	3	3	2	16	3	4	4		
Zinc	53	400,000	350	450	175	1,160	500	103	46	79	47	2,300	1,420	73	53		
Asbestos (SQ)					ND	AF/FA Only	AF/FA & ACM	ND	ND	-	-	ND	ND	-	-		
AF/FA	ND	< 0.001 ⁴	0.001	0.001				-	-	-	-	-	-	-	-	-	-
% ACM	ND	< 0.05 ⁴	0.01	0.01				-	-	-	-	-	-	-	-	-	-

Former Tokanui Psychiatric Hospital - Toilet Block: Soil Results																	
Sample Date	Background Concentrations ¹	NESCS commercial/ industrial outdoor worker (unpaved) ²	Site Specific Remedial Standards - Rural Residential ³	Site Specific Remedial Standards - Managed ³	Waste Acceptance Criteria			13-May-25		13-Jun-25		13-May-25		13-Jun-25			
Sample Name								TBS 0.5 A	TBS 0.5 B	TBS 0.5 C	TBS 0.5 D	TBN 0.5 A	TBN 0.5 B	TBN 0.5 C	TBN 0.5 D		
Sample Depth (m)					0-0.15m	0.15-0.3m	0.3-0.5m	0.5-0.7m	0-0.15m	0.15-0.3m	0.3-0.5m	0.5-0.7m					
Lab Number					3892810.34	3892810.35	3916050.70	3916050.80	3892810.36	3892810.37	3916050.10	3916050.20					
Heavy Metals																	
(mg/kg dry weight)																	
Arsenic	6.8	70	9	70	17	70	100	<u>7</u>	5	2	3	5	4	<u>20</u>	8		
Cadmium	0.22	1,300	0.9	10	0.8	1.2	20	<u>0.57</u>	<u>0.33</u>	< 0.10	< 0.10	<u>0.44</u>	<u>0.26</u>	0.14	0.14		
Chromium	30	6,300	150	150	56	362	100	10	11	8	7	8	7	11	10		
Copper	25	>10,000	280	280	120	107	200	36	25	11	10	23	18	23	15		
Lead	20	3,300	120	460	78	210	200	<u>110</u>	<u>84</u>	<u>23</u>	17	<u>53</u>	<u>22</u>	18.6	19.9		
Nickel	7.6	6,000	-	-	33	320	200	5	8	3	3	4	5	3	3		
Zinc	53	400,000	350	450	175	1,160	500	<u>400</u>	<u>159</u>	43	31	<u>188</u>	<u>72</u>	<u>63</u>	50		
Asbestos (SQ)					ND	AF/FA Only	AF/FA & ACM	ND	ND	-	-	ND	ND	-	-		
AF/FA	ND	< 0.001 ⁴	0.001	0.001				-	-	-	-	-	-	-	-	-	-
% ACM	ND	< 0.05 ⁴	0.01	0.01				-	-	-	-	-	-	-	-	-	-

Notes:

* = Residual concentrations detected

1. Upper limit background concentrations for selected elements in soil of the Waikato region, acid recoverable data, sourced from: <https://www.waikatoregion.govt.nz/services/regional-services/waste-hazardous-substances-and-contaminated-sites/contaminated-sites/natural-background-concentrations/>

2. Resource Management (National Environmental Standard for Assessing and managing Contaminants in Soil to Protect Human Health) Regulation 2012 (NES:CS) - Soil contaminant standards (SCS) applicable to commercial/industrial land use have been selected.

3. Site Specific Remedial Standards as presented in HAIL Environmental Ltd Site Specific Risk Assessment, Version 3.2, dated February 2024

4. BRANZ 2017 Asbestos in Soil guidelines of 0.05% w/w % ACM or 0.001% w/w for % FA & AF fraction (Commercial/Industrial guidelines applied to assess risk to Remedial workers)

Underlined:

Above background concentrations

Italicised

Above NES:CS / BRANZ Guideline (Commercial/Industrial land use - Outdoor Worker)

RED:

Exceeded SSRA Rural Residential

BOLD:

Exceeded SSRA Managed

ND:

Not detected

-

Not tested for

Yellow

Above cleanfill acceptance criteria

Orange

Above managed fill acceptance criteria

Black

Above Class 1 landfill acceptance criteria

Red

Exceeds Class 1 Landfill TCLP Limit

Former Tokanui Psychiatric Hospital - Toilet Block: TCLP (Zinc) Test Results			
Sample Date	Waste Acceptance Criteria		13-May-25
Sample Name			TBW 0.5 A
Sample Depth (m)	Landfill (Hampton Downs, TCLP Criteria)	Landfill (Hampton Downs, Max Acceptable Value)	0-0.15m
Lab Number			3892810.48
Heavy Metals			
(g/m ³)			
Zinc	10	N/L	14.7

Former Tokanui Psychiatric Hospital - Bowling Green: Soil Results

Former Tokanui Psychiatric Hospital - Bowling Green: Soil Results																
Sample Date	Background Concentrations ¹	NESCS commercial/ industrial outdoor worker (unpaved) ²	Site Specific Remedial Standards - Rural Residential ³	Site Specific Remedial Standards - Managed ³	Waste Acceptance Criteria			13-May-25	13-Jun-25				13-May-25	13-Jun-25		
Sample Name								BG01				BG02				
Sample Depth (m)					0-0.15m	0.15-0.3	0.3-0.5	0.5-0.7	0-0.15m	0.15-0.3	0.3-0.5	0.5-0.7				
Lab Number					3892810.38	3916050.9	3916050.10	3916050.11	3892810.39	3916050.12	3916050.13	3916050.14				
Heavy Metals (mg/kg dry weight)					95% upper limit for background (mg/kg)				WRC Cleanfill Criteria	Envirofill South (Managed Fill)	Hampton Downs landfill					
Arsenic	6.8	70	9	70	17	70	100	5	3	3	2	5	4	2	2	
Cadmium	0.22	1,300	0.9	10	0.8	1.2	20	0.31	< 0.10	< 0.10	< 0.10	0.23	0.19	< 0.10	< 0.10	
Chromium	30	6,300	150	150	56	362	100	9	5	5	5	7	7	6	5	
Copper	25	>10,000	280	280	120	107	200	16	9	7	6	16	13	7	5	
Lead	20	3,300	120	460	78	210	200	21	16.2	15.7	16.8	18.5	17.3	16.2	15.6	
Mercury	0.23	4,200	3	3	1.0	NS	NS	0.12	< 0.10	< 0.10	< 0.10	< 0.10	0.16	0.15	< 0.10	
Nickel	7.6	6,000	-	-	33	320	200	4	2	2	2	5	3	3	< 2	
Zinc	53	400,000	350	450	175	1,160	500	61	38	31	25	76	49	26	21	
OCPs																
Total DDT	-	1,000	2	2	0.5	12	0.7	< 0.09	< 0.08	< 0.08	< 0.09	< 0.09	< 0.09	< 0.08	< 0.08	
Dieldrin	-	160	-	-	0.02	0.02	1.3	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014	< 0.015	< 0.013	< 0.013	

Former Tokanui Psychiatric Hospital - Bowling Green: Soil Results																
Sample Date	Background Concentrations ¹	NESCS commercial/ industrial outdoor worker (unpaved) ²	Site Specific Remedial Standards - Rural Residential ³	Site Specific Remedial Standards - Managed ³	Waste Acceptance Criteria			13-May-25	13-Jun-25				13-May-25	13-Jun-25		
Sample Name								BG03				BG04				
Sample Depth (m)					0-0.15m	0.15-0.3	0.3-0.5	0.5-0.7	0-0.15m	0.15-0.3	0.3-0.5	0.5-0.7				
Lab Number					3892810.40	3916050.15	3916050.16	3916050.17	3892810.41	3916050.18	3916050.19	3916050.20				
Heavy Metals																
(mg/kg dry weight)																
Arsenic	6.8	70	9	70	17	70	100	<u>7</u>	4	<u>12</u>	< 2	<u>35</u>	5	6	7	
Cadmium	0.22	1,300	0.9	10	0.8	1.2	20	<u>0.3</u>	< 0.10	< 0.10	< 0.10	<u>0.44</u>	0.17	0.22	0.13	
Chromium	30	6,300	150	150	56	362	100	8	7	8	3	9	8	9	10	
Copper	25	>10,000	280	280	120	107	200	19	9	21	4	23	16	<u>36</u>	21	
Lead	20	3,300	120	460	78	210	200	<u>22</u>	15.4	<u>24</u>	10.5	<u>30</u>	19.5	14.8	16.2	
Mercury	0.23	4,200	3	3	1.0	NS	NS	0.12	< 0.10	< 0.10	< 0.10	0.11	0.16	<u>0.26</u>	0.17	
Nickel	7.6	6,000	-	-	33	320	200	4	3	<u>40</u>	< 2	5	3	4	4	
Zinc	53	400,000	350	450	175	1,160	500	<u>68</u>	35	20	12	<u>117</u>	<u>58</u>	<u>94</u>	<u>59</u>	
OCPs																
Total DDT	-	1,000	2	2	0.5	12	0.7	< 0.08*	< 0.08	< 0.08	< 0.08	< 0.08*	< 0.09	< 0.10	< 0.09	
Dieldrin	-	160	-	-	0.02	0.02	1.3	< 0.013	< 0.013	< 0.013	< 0.012	< 0.014	< 0.014	< 0.016	< 0.014	
PAHs																
BAP (Eq)	-	35	6	35	2	35	1	-	-	< 0.031	-	-	-	-	-	

Notes:

- Upper limit background concentrations for selected elements in soil of the Waikato region, acid recoverable data, sourced from: <https://www.waikatoregion.govt.nz/services/regional-services/waste-hazardous-substances-and-contaminated->
- Resource Management (National Environmental Standard for Assessing and managing Contaminants in Soil to Protect Human Health) Regulation 2012 (NES:CS) - Soil contaminant standards (SCS) applicable to commercial/industrial land use have been selected.
- Site Specific Remedial Standards as presented in HAIL Environmental Ltd Site Specific Risk Assessment, Version 3.2, dated February 2024

Underlined: Above background concentrations
Italicised: Above NES:CS (Commercial/Industrial land use - Outdoor Worker)
RED: Exceeded SSRA Rural Residential
BOLD: Exceeded SSRA Managed
 ND: Not detected
 - : Not tested for
 * : Residual concentrations detected
 Above cleanfill acceptance criteria
 Above managed fill acceptance criteria
 Above Class 1 landfill acceptance criteria

4.0 DISCUSSION

Analytical results for the bowling green found:

- One or more heavy metal concentrations were elevated above upper limit background levels for soils in the Waikato Region in 8 of the 16 samples analysed;
- In particular, arsenic concentrations in two samples (BG03 0.3-0.5m & BG04 0-0.15m) were in exceedance of the rural-residential SSRS;
- Very low level OCPs (DDE & DDT) were detected in 2 of the 16 samples analysed (BG03 0-0.15m & BG04 0-0.15m);
- PAHs were not detected in the single sample analysed where minor fill was encountered; and
- No exceedances of the NES: CS guidelines were noted.

Analytical results for the toilet block found:

- One or more heavy metal concentrations were elevated above upper limit background levels for soils in the Waikato Region in 11 of the 16 samples analysed;
- In particular, arsenic concentrations in two samples (TBW 0.5A & TBN 0.5 C), lead concentrations in a single sample (TBW 0.5A), and zinc concentrations in a single sample (TBS 0.5A) were in exceedance of the rural-residential SSRS, and zinc concentrations in two samples (TBW 0.5A & TBW 0.5B) were in exceedance of the Managed SSRS;
- No asbestos was detected in any of the 8 samples analysed; and
- No exceedances of the NES: CS guidelines were noted.

Based on analytical results from samples surrounding the toilet block, toxicity characteristic leaching procedure (TCLP) analysis was undertaken on a single sample (TBW 0.5 A) found to contain moderate to high-level zinc contamination. TCLP analysis found that zinc concentrations in the sample were in exceedance of the TCLP waste acceptance criteria (WAC) for a Class 1 Landfill.

Hence, overall, some samples were found to contain contaminant concentrations elevated above the rural-residential and managed SSRS values and/or the Class 1 Landfill TCLP criteria. Soils containing elevated contaminant concentrations are to be managed in accordance with the soil management recommendations below.

5.0 SOIL MANAGEMENT CRITERIA

In accordance with the FTL Remedial Action Plan (RAP) dated April 2025, contamination level classifications have been established to determine the applicable soil management and disposal requirements of the remedial approach for the Tokanui Hospital site. Classifications are defined as:

- Low Level contamination: exceeds the Site-Specific Rural Residential Remedial Standard but not the Site-Specific Managed Remedial Standard;
- Moderate Level contamination: exceeds the Site-Specific Managed Remedial Standard; and
- High Level contamination: exceeds Class B criteria for asbestos contamination and Class 1 landfill TCLP criteria for other contaminants.

6.0 CONCLUSIONS & RECOMMENDATIONS

Based on the soil management criteria above, FTL recommends that:

- Soils from sample locations BG04 (0-0.15m) and BG03 (0.3-0.5m) within the bowling green area that contain low-level arsenic contamination should be excavated and shifted into Area D/E/F of the Tokanui Hospital existing disposal site.
- Soils from sample locations TBS 0.5 A (0-0.15m depth) and TBN 0.5 C (0.3-0.5m) that contain low-level heavy metal contamination should be excavated and shifted into Area D/E/F of the Tokanui Hospital existing disposal site.
- Soils from location TBW 0.5 contain moderate to high-level zinc contamination exceeding the Class 1 Landfill TCLP WAC. Hence, soils from 0-0.3m depth in this location are unsuitable to be moved into Area D/E/F of the Tokanui Hospital existing disposal site in their current form. These soils should be mixed and blended with other 'less contaminated soils', and then moved into the existing disposal site. If this is not possible, these soils will require disposal off-site to an approved facility due to leachability issues, and would require mixing with other soils with lower zinc levels to comply with Class 1 landfill WAC.
- It should be noted that a thick concrete surround was encountered at the toilet block building. Samples were collected at the edge extents of the concrete. However, the remedial volumes below will likely be reduced during remedial works due to reassessment of the area via XRF delineation. Volumes provided below (for toilet block) are therefore provisional and subject to change.
- Estimated volumes of soils to be relocated from the toilet block and bowling green and disposed of within the Tokanui Hospital existing disposal site are:
 - Toilet Block = 15m³
 - Bowling Green = 172m³

These volumes will likely be reduced through XRF screening delineation during remedial works.

All other soils assessed can be left undisturbed.

7.0 LIMITATIONS

Copyright of this report is held by Fraser Thomas Ltd. Limited soil sampling has been undertaken as part of this investigation. The professional opinion expressed herein has been prepared solely for, and is furnished to our client, Toitū Te Whenua – Land Information New Zealand, on the express condition that it will only be used for the works and the purpose for which it is intended. No liability is accepted by this firm or by any principal, or director, or any servant or agent of this firm, in respect of its use by any other person, and any other person who relies upon any matter contained in this report does so entirely at its own risk. This disclaimer shall apply notwithstanding that this report may be made available to any person by any person in connection with any application for permission or approval, or pursuant to any requirement of law.

Yours sincerely

FRASER THOMAS LIMITED



Elliot Bish
Senior Environmental Scientist
CEnvP-G



Sean M Finnigan
Director – Environmental
CEnvP-SC



Attached:

Figure 1 – Site Location Plan

Figure 2 – Sample Location Plan –
 Bowling Green

Figure 2-1 – Sample Location Plan
 – Toilet Block

Appendix A – Site Photos

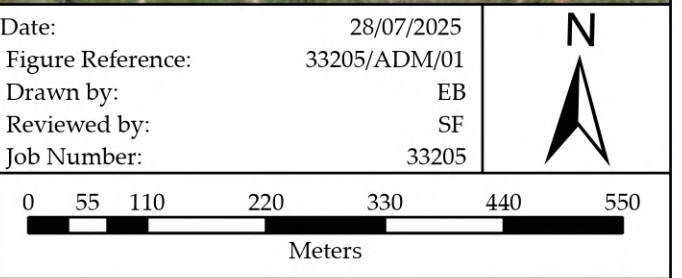
Appendix B – Laboratory Transcripts



Legend

Site Boundary	
Bowling Green	
Toilet Block	

Over 50 Years Fraser Thomas ENGINEERS • RESOURCE MANAGERS • SURVEYORS	Figure 1: Site Location Plan	Date:28/07/2025 Figure Reference:33205/ADM/01 Drawn by:EB Reviewed by:SF Job Number:33205 055110220330440550 Meters	N 
	Toitū Te Whenua Land Information New Zealand Former Tokanui Hospital Demolition and Remediation Project Additional Structures Memo Tokanui, Te Awamutu		



Building	Remedial/Management Area	Area (m ²)	Depth (m)	Volume (m ³)
Bowling Green	Low Level Contamination	764	0.15-0.3	172.0
	Can Remain Onsite	773	0.15	115.9
Total Area/Volume		1537	-	287.9



Building	Remedial/Management Area	Area (m ²)	Depth (m)	Volume (m ³)
Toilet Block	Area to Reassess (Potential Removal)	36	0.15-0.5	~15
Total Area/Volume		36		~15

Note: Soils under concrete surround are to be assessed at the time of demolition and remediation, given the investigation of this structure was impeded by the thick and extensive concrete surround, and dense vegetation.

Removal volumes to be advised during demolition works, supported by XRF delineation

Legend

Sample Location (June 2025)



> Background < SSRA RR



> SSRA RR < SSRA M



Concrete Surround



Toilet Block



Material to Reassess after Concrete paving is removed



Site Boundary

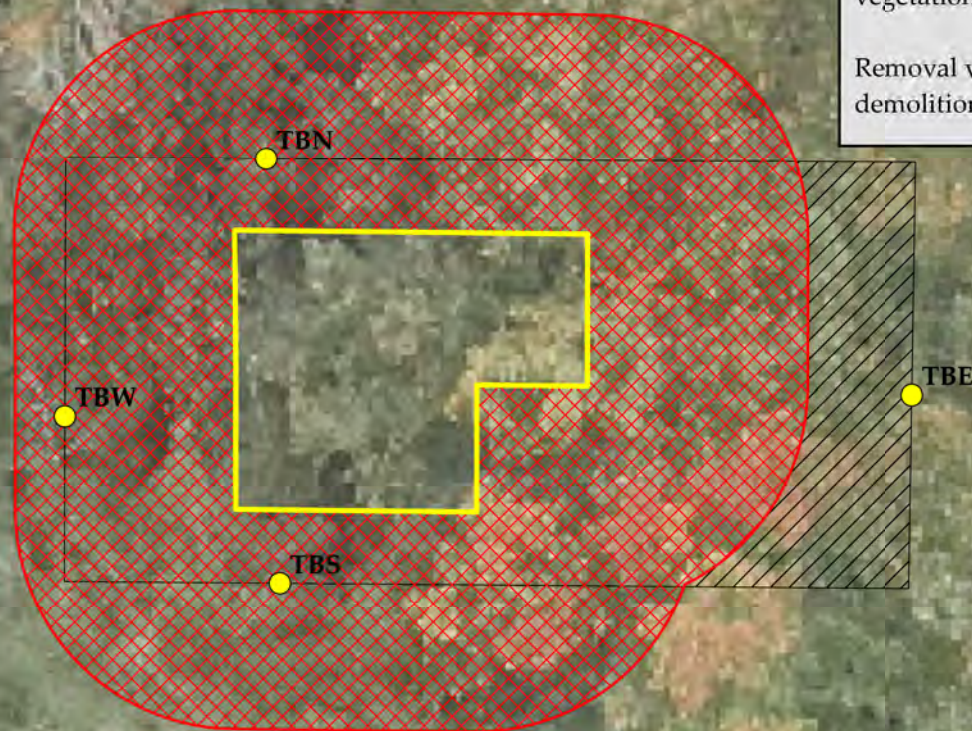


Figure 2-1: Sample Location Plan - Toilet Block

Toitū Te Whenua Land Information New Zealand
Former Tokanui Hospital Demolition and Remediation Project
Additional Structures Memo
Tokanui, Te Awamutu

Date: 8/08/2025
Figure Reference: 33205/ADM/02-1
Drawn by: EB
Reviewed by: SF
Job Number: 33205





North Facade



East Facade



South Facade



West Facade



Toilet Block - Internal



Toilet Block - Internal



Bowling Green Area - Te Mawhai Entrance



Bowling Green Area

Certificate of Analysis

Page 1 of 9

Client:	Fraser Thomas Limited	Lab No:	3892810	SPv3
Contact:	Elliot Bish	Date Received:	20-May-2025	
	C/- Fraser Thomas Limited	Date Reported:	27-Jun-2025	(Amended)
	PO Box 204006	Quote No:	92882	
	Highbrook	Order No:	PO001344	
	Auckland 2161	Client Reference:	33097	
		Submitted By:	Ben Laing-McConnell	

Sample Type: Soil

Sample Name:	TPAG14B 0-0.15m 12-May-2025	TPAG14B 0.15-0.7m 12-May-2025	TPAG14B 0.7-1.0m 12-May-2025	TPAG14C 0-0.15m 12-May-2025	TPAG14C 0.15-0.45m 12-May-2025
Lab Number:	3892810.1	3892810.2	3892810.3	3892810.4	3892810.5

Individual Tests

Dry Matter	g/100g as rcvd	77	87	75	77	84
TCLP Weight of Sample Taken	g	-	-	50	-	-
TCLP Initial Sample pH	pH Units	-	-	7.7	-	-
TCLP Acid Adjusted Sample pH	pH Units	-	-	1.7	-	-
TCLP Extractant Type*		-	-	NaOH/Acetic acid at pH 4.93 +/- 0.05	-	-
TCLP Extraction Fluid pH	pH Units	-	-	5.0	-	-
TCLP Post Extraction Sample pH	pH Units	-	-	5.1	-	-

7 Heavy metals plus Boron

Total Recoverable Arsenic	mg/kg dry wt	4	4	4	5	4
Total Recoverable Boron	mg/kg dry wt	< 20	82	21	< 20	< 20
Total Recoverable Cadmium	mg/kg dry wt	0.17	0.10	0.72	0.26	0.11
Total Recoverable Chromium	mg/kg dry wt	14	24	7	13	23
Total Recoverable Copper	mg/kg dry wt	27	21	27	34	18
Total Recoverable Lead	mg/kg dry wt	29	23	620	54	26
Total Recoverable Nickel	mg/kg dry wt	10	15	4	10	11
Total Recoverable Zinc	mg/kg dry wt	77	76	320	101	67

Polycyclic Aromatic Hydrocarbons Screening in Soil*

Total of Reported PAHs in Soil	mg/kg dry wt	1.3	1.9	< 0.4	2.3	< 0.3
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.013	< 0.012
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.013	< 0.012
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.013	< 0.012
Acenaphthene	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.013	< 0.012
Anthracene	mg/kg dry wt	0.013	0.044	< 0.014	0.035	< 0.012
Benzo[a]anthracene	mg/kg dry wt	0.098	0.156	< 0.014	0.169	< 0.012
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.137	0.153	< 0.014	0.22	< 0.012
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.20	0.23	< 0.032	0.32	< 0.029
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.199	0.23	< 0.032	0.32	< 0.029
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.163	0.186	< 0.014	0.26	0.012
Benzo[e]pyrene	mg/kg dry wt	0.080	0.092	< 0.014	0.136	< 0.012
Benzo[g,h,i]perylene	mg/kg dry wt	0.089	0.090	< 0.014	0.141	< 0.012
Benzo[k]fluoranthene	mg/kg dry wt	0.067	0.086	< 0.014	0.101	< 0.012
Chrysene	mg/kg dry wt	0.090	0.138	< 0.014	0.196	< 0.012
Dibenzo[a,h]anthracene	mg/kg dry wt	0.019	0.023	< 0.014	0.033	< 0.012
Fluoranthene	mg/kg dry wt	0.184	0.36	< 0.014	0.36	0.013



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Soil						
Sample Name:		TPAG14B 0-0.15m 12-May-2025	TPAG14B 0.15-0.7m 12-May-2025	TPAG14B 0.7-1.0m 12-May-2025	TPAG14C 0-0.15m 12-May-2025	TPAG14C 0.15-0.45m 12-May-2025
Lab Number:		3892810.1	3892810.2	3892810.3	3892810.4	3892810.5
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Fluorene	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.013	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.092	0.090	< 0.014	0.140	< 0.012
Naphthalene	mg/kg dry wt	< 0.07	< 0.06	< 0.07	< 0.07	< 0.06
Perylene	mg/kg dry wt	0.032	0.034	< 0.014	0.046	< 0.012
Phenanthrene	mg/kg dry wt	0.057	0.166	< 0.014	0.130	< 0.012
Pyrene	mg/kg dry wt	0.179	0.31	< 0.014	0.34	0.014
Sample Name:		TPAG14C 0.45-0.85m 12-May-2025	TPAG14D 0-0.1m 12-May-2025	TPAG14D 0.1-0.3m 12-May-2025	TPAG14D 0.3-0.55m 12-May-2025	TPAG14E 0-0.15m 12-May-2025
Lab Number:		3892810.6	3892810.7	3892810.8	3892810.9	3892810.10
Individual Tests						
Dry Matter	g/100g as rcvd	75	68	68	74	79
SPLP Sample Weight	g	-	50	-	-	-
SPLP Extractant Type*		-	De-ionised Water, pH 5.8 +/- 0.4	-	-	-
SPLP Final pH	pH Units	-	9.0	-	-	-
7 Heavy metals plus Boron						
Total Recoverable Arsenic	mg/kg dry wt	3	6	9	2	6
Total Recoverable Boron	mg/kg dry wt	< 20	480	2,300	41	33
Total Recoverable Cadmium	mg/kg dry wt	0.25	0.36	0.24	0.21	0.35
Total Recoverable Chromium	mg/kg dry wt	6	13	19	5	13
Total Recoverable Copper	mg/kg dry wt	16	50	41	16	34
Total Recoverable Lead	mg/kg dry wt	71	45	19.8	17.1	62
Total Recoverable Nickel	mg/kg dry wt	3	35	65	3	11
Total Recoverable Zinc	mg/kg dry wt	77	132	230	89	119
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	1.9	< 0.4	< 0.4	3.7
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.015	< 0.015	< 0.014	< 0.013
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.015	< 0.015	< 0.014	< 0.013
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.015	< 0.015	< 0.014	0.018
Acenaphthene	mg/kg dry wt	< 0.013	< 0.015	< 0.015	< 0.014	< 0.013
Anthracene	mg/kg dry wt	< 0.013	0.019	< 0.015	< 0.014	0.050
Benzo[a]anthracene	mg/kg dry wt	< 0.013	0.146	< 0.015	< 0.014	0.28
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	0.193	< 0.015	< 0.014	0.34
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.032	0.29	< 0.035	< 0.033	0.51
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.031	0.28	< 0.035	< 0.033	0.51
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.013	0.23	< 0.015	< 0.014	0.41
Benzo[e]pyrene	mg/kg dry wt	< 0.013	0.123	< 0.015	< 0.014	0.21
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	0.130	< 0.015	< 0.014	0.24
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	0.099	< 0.015	< 0.014	0.169
Chrysene	mg/kg dry wt	< 0.013	0.140	< 0.015	< 0.014	0.25
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	0.028	< 0.015	< 0.014	0.052
Fluoranthene	mg/kg dry wt	0.024	0.29	< 0.015	< 0.014	0.61
Fluorene	mg/kg dry wt	< 0.013	< 0.015	< 0.015	< 0.014	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	0.136	< 0.015	< 0.014	0.24
Naphthalene	mg/kg dry wt	< 0.07	< 0.08	< 0.08	< 0.07	< 0.07
Perylene	mg/kg dry wt	< 0.013	0.048	< 0.015	< 0.014	0.072
Phenanthrene	mg/kg dry wt	0.024	0.059	< 0.015	< 0.014	0.166
Pyrene	mg/kg dry wt	0.022	0.29	< 0.015	< 0.014	0.56

Sample Type: Soil						
Sample Name:		TPAG14E 0.15-0.7m 12-May-2025	TPAG14E 0.7-1.0m 12-May-2025	TPAG14E 1.0-1.7m 12-May-2025	TPAG14E 1.7m + 12-May-2025	TPAG14F 0-0.15m 12-May-2025
Lab Number:		3892810.12	3892810.13	3892810.14	3892810.15	3892810.16
Individual Tests						
Dry Matter	g/100g as rcvd	87	76	74	68	76
SPLP Sample Weight	g	-	50	-	-	-
SPLP Extractant Type*		-	De-ionised Water, pH 5.8 +/- 0.4	-	-	-
SPLP Final pH	pH Units	-	8.4	-	-	-
TCLP Weight of Sample Taken	g	-	50	50	-	-
TCLP Initial Sample pH	pH Units	-	8.9	7.8	-	-
TCLP Acid Adjusted Sample pH	pH Units	-	4.1	1.8	-	-
TCLP Extractant Type*		-	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05	-	-
TCLP Extraction Fluid pH	pH Units	-	5.0	5.0	-	-
TCLP Post Extraction Sample pH	pH Units	-	6.8	5.1	-	-
7 Heavy metals plus Boron						
Total Recoverable Arsenic	mg/kg dry wt	4	8	5	3	6
Total Recoverable Boron	mg/kg dry wt	< 20	3,200	139	67	560
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.27	0.62	< 0.10	0.19
Total Recoverable Chromium	mg/kg dry wt	21	23	10	7	19
Total Recoverable Copper	mg/kg dry wt	22	34	20	15	32
Total Recoverable Lead	mg/kg dry wt	22	14.4	4,200	19.2	27
Total Recoverable Nickel	mg/kg dry wt	11	16	6	5	33
Total Recoverable Zinc	mg/kg dry wt	67	31	340	51	98
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.6	< 0.4	< 0.4	< 0.4	1.1
1-Methylnaphthalene	mg/kg dry wt	< 0.011	< 0.013	< 0.014	< 0.015	< 0.013
2-Methylnaphthalene	mg/kg dry wt	< 0.011	< 0.013	< 0.014	< 0.015	< 0.013
Acenaphthylene	mg/kg dry wt	< 0.011	< 0.013	< 0.014	< 0.015	< 0.013
Acenaphthene	mg/kg dry wt	< 0.011	< 0.013	< 0.014	< 0.015	< 0.013
Anthracene	mg/kg dry wt	< 0.011	< 0.013	< 0.014	< 0.015	0.014
Benzo[a]anthracene	mg/kg dry wt	0.047	< 0.013	0.015	< 0.015	0.077
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.052	< 0.013	< 0.014	< 0.015	0.102
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.070	< 0.031	< 0.032	< 0.035	0.152
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.069	< 0.031	< 0.032	< 0.035	0.150
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.060	0.016	0.032	< 0.015	0.124
Benzo[e]pyrene	mg/kg dry wt	0.030	< 0.013	0.022	< 0.015	0.066
Benzo[g,h,i]perylene	mg/kg dry wt	0.032	< 0.013	0.015	< 0.015	0.069
Benzo[k]fluoranthene	mg/kg dry wt	0.029	< 0.013	< 0.014	< 0.015	0.050
Chrysene	mg/kg dry wt	0.045	< 0.013	0.034	< 0.015	0.072
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.011	< 0.013	< 0.014	< 0.015	0.015
Fluoranthene	mg/kg dry wt	0.122	0.025	0.037	< 0.015	0.160
Fluorene	mg/kg dry wt	< 0.011	< 0.013	< 0.014	< 0.015	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.031	< 0.013	0.016	< 0.015	0.071
Naphthalene	mg/kg dry wt	< 0.06	< 0.07	< 0.07	< 0.08	< 0.07
Perylene	mg/kg dry wt	< 0.011	0.043	< 0.014	< 0.015	0.025
Phenanthrene	mg/kg dry wt	0.027	0.017	0.021	< 0.015	0.052
Pyrene	mg/kg dry wt	0.108	0.024	0.043	< 0.015	0.152
Sample Name:		TPAG14F 0.15-0.3m 12-May-2025	TPAG14F 0.3-0.5m 12-May-2025	TPAG14G 0-0.15m 12-May-2025	TPAG14G 0.15-0.6m 12-May-2025	TPAG14G 0.6-2.0m 12-May-2025
Lab Number:		3892810.17	3892810.18	3892810.19	3892810.20	3892810.21
Individual Tests						
Dry Matter	g/100g as rcvd	86	74	76	84	77
SPLP Sample Weight	g	50	-	-	-	-

Sample Type: Soil						
Sample Name:		TPAG14F 0.15-0.3m 12-May-2025	TPAG14F 0.3-0.5m 12-May-2025	TPAG14G 0-0.15m 12-May-2025	TPAG14G 0.15-0.6m 12-May-2025	TPAG14G 0.6-2.0m 12-May-2025
Lab Number:		3892810.17	3892810.18	3892810.19	3892810.20	3892810.21
Individual Tests						
SPLP Extractant Type*		De-ionised Water, pH 5.8 +/- 0.4	-	-	-	-
SPLP Final pH		pH Units 9.4	-	-	-	-
7 Heavy metals plus Boron						
Total Recoverable Arsenic	mg/kg dry wt	4	3	4	3	4
Total Recoverable Boron	mg/kg dry wt	640	78	20	< 20	40
Total Recoverable Cadmium	mg/kg dry wt	0.12	0.26	0.15	< 0.10	0.16
Total Recoverable Chromium	mg/kg dry wt	12	6	10	24	8
Total Recoverable Copper	mg/kg dry wt	21	29	21	17	19
Total Recoverable Lead	mg/kg dry wt	53	30	36	17.7	52
Total Recoverable Nickel	mg/kg dry wt	23	4	7	10	6
Total Recoverable Zinc	mg/kg dry wt	84	96	67	63	75
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.4	< 0.4	1.0	< 0.3	0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.012	< 0.013	< 0.013	< 0.012	< 0.013
2-Methylnaphthalene	mg/kg dry wt	< 0.012	< 0.013	< 0.013	< 0.012	< 0.013
Acenaphthylene	mg/kg dry wt	< 0.012	< 0.013	< 0.013	< 0.012	< 0.013
Acenaphthene	mg/kg dry wt	< 0.012	< 0.013	< 0.013	< 0.012	< 0.013
Anthracene	mg/kg dry wt	< 0.012	< 0.013	< 0.013	< 0.012	< 0.013
Benzo[a]anthracene	mg/kg dry wt	0.024	< 0.013	0.075	< 0.012	0.028
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.032	< 0.013	0.099	0.018	0.040
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.043	< 0.032	0.146	< 0.028	0.053
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.042	< 0.032	0.144	< 0.028	0.053
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.037	< 0.013	0.118	0.019	0.047
Benzo[e]pyrene	mg/kg dry wt	0.022	< 0.013	0.063	0.013	0.026
Benzo[g,h,i]perylene	mg/kg dry wt	0.025	< 0.013	0.067	0.020	0.032
Benzo[k]fluoranthene	mg/kg dry wt	0.016	< 0.013	0.048	< 0.012	0.019
Chrysene	mg/kg dry wt	0.027	< 0.013	0.071	0.012	0.027
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.012	< 0.013	0.014	< 0.012	< 0.013
Fluoranthene	mg/kg dry wt	0.051	< 0.013	0.152	0.025	0.055
Fluorene	mg/kg dry wt	< 0.012	< 0.013	< 0.013	< 0.012	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.025	< 0.013	0.068	0.019	0.030
Naphthalene	mg/kg dry wt	< 0.06	< 0.07	< 0.07	< 0.06	< 0.07
Perylene	mg/kg dry wt	0.018	< 0.013	0.022	< 0.012	< 0.013
Phenanthrene	mg/kg dry wt	0.025	< 0.013	0.040	< 0.012	0.022
Pyrene	mg/kg dry wt	0.055	< 0.013	0.149	0.024	0.057
Sample Name:		TPAG14G 2.0-3.0m 12-May-2025	TPAG15A 0-0.4m 12-May-2025	TPAG15A 0.4m + 12-May-2025	TPAG15B 0-0.1m 12-May-2025	TPAG15B 0.1-0.5m 12-May-2025
Lab Number:		3892810.22	3892810.23	3892810.24	3892810.25	3892810.26
Individual Tests						
Dry Matter		g/100g as rcvd 64	70	75	76	72
7 Heavy metals plus Boron						
Total Recoverable Arsenic	mg/kg dry wt	4	3	4	6	8
Total Recoverable Boron	mg/kg dry wt	62	< 20	< 20	< 20	45
Total Recoverable Cadmium	mg/kg dry wt	0.39	< 0.10	0.29	0.66	0.35
Total Recoverable Chromium	mg/kg dry wt	12	6	8	10	6
Total Recoverable Copper	mg/kg dry wt	30	14	20	32	55
Total Recoverable Lead	mg/kg dry wt	58	14.2	88	142	53
Total Recoverable Nickel	mg/kg dry wt	12	3	4	10	7
Total Recoverable Zinc	mg/kg dry wt	189	37	82	148	81

Sample Type: Soil						
Sample Name:		TPAG14G 2.0-3.0m 12-May-2025	TPAG15A 0-0.4m 12-May-2025	TPAG15A 0.4m + 12-May-2025	TPAG15B 0-0.1m 12-May-2025	TPAG15B 0.1-0.5m 12-May-2025
Lab Number:		3892810.22	3892810.23	3892810.24	3892810.25	3892810.26
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	< 0.4	0.3	0.9	< 0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	< 0.013	< 0.014
2-Methylnaphthalene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	< 0.013	< 0.014
Acenaphthylene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	< 0.013	< 0.014
Acenaphthene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	< 0.013	< 0.014
Anthracene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	< 0.013	< 0.014
Benzo[a]anthracene	mg/kg dry wt	< 0.016	< 0.015	0.024	0.067	< 0.014
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.016	< 0.015	0.033	0.083	0.015
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.038	< 0.035	0.049	0.124	< 0.033
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.038	< 0.034	0.049	0.122	< 0.032
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.016	< 0.015	0.039	0.102	0.017
Benzo[e]pyrene	mg/kg dry wt	< 0.016	< 0.015	0.021	0.052	< 0.014
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.016	< 0.015	0.024	0.057	< 0.014
Benzo[k]fluoranthene	mg/kg dry wt	< 0.016	< 0.015	0.018	0.042	< 0.014
Chrysene	mg/kg dry wt	< 0.016	< 0.015	0.024	0.063	< 0.014
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	< 0.013	< 0.014
Fluoranthene	mg/kg dry wt	< 0.016	< 0.015	0.045	0.146	0.021
Fluorene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	< 0.013	< 0.014
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.016	< 0.015	0.023	0.055	< 0.014
Naphthalene	mg/kg dry wt	< 0.08	< 0.08	< 0.07	< 0.07	< 0.07
Perylene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	0.018	< 0.014
Phenanthrene	mg/kg dry wt	< 0.016	< 0.015	< 0.014	0.040	0.015
Pyrene	mg/kg dry wt	< 0.016	< 0.015	0.050	0.143	0.023

Sample Name:		TPAG15B 0.5-0.7m 12-May-2025	TPAG15C 0-0.1m 12-May-2025	TPAG15C 0.1-0.3m 12-May-2025	TBE 0.5 A 12-May-2025	TBE 0.5 B 12-May-2025
Lab Number:		3892810.27	3892810.28	3892810.29	3892810.30	3892810.31
Individual Tests						
Dry Matter	g/100g as rcvd	73	87	79	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	-	-	4	3
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	0.27	< 0.10
Total Recoverable Chromium	mg/kg dry wt	-	-	-	9	8
Total Recoverable Copper	mg/kg dry wt	-	-	-	18	14
Total Recoverable Lead	mg/kg dry wt	-	-	-	33	17.7
Total Recoverable Nickel	mg/kg dry wt	-	-	-	4	3
Total Recoverable Zinc	mg/kg dry wt	-	-	-	103	46
7 Heavy metals plus Boron						
Total Recoverable Arsenic	mg/kg dry wt	< 2	5	5	-	-
Total Recoverable Boron	mg/kg dry wt	< 20	< 20	< 20	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.21	0.14	-	-
Total Recoverable Chromium	mg/kg dry wt	7	10	9	-	-
Total Recoverable Copper	mg/kg dry wt	5	22	15	-	-
Total Recoverable Lead	mg/kg dry wt	14.6	73	41	-	-
Total Recoverable Nickel	mg/kg dry wt	2	12	4	-	-
Total Recoverable Zinc	mg/kg dry wt	27	109	76	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	< 0.3	< 0.3	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Acenaphthene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-

Sample Type: Soil						
Sample Name:		TPAG15B 0.5-0.7m 12-May-2025	TPAG15C 0-0.1m 12-May-2025	TPAG15C 0.1-0.3m 12-May-2025	TBE 0.5 A 12-May-2025	TBE 0.5 B 12-May-2025
Lab Number:		3892810.27	3892810.28	3892810.29	3892810.30	3892810.31
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Anthracene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.014	0.016	< 0.013	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.032	< 0.028	< 0.030	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.032	< 0.028	< 0.030	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.014	0.018	< 0.013	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.014	0.011	< 0.013	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Chrysene	mg/kg dry wt	< 0.014	0.012	< 0.013	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Fluoranthene	mg/kg dry wt	< 0.014	0.015	0.016	-	-
Fluorene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.014	0.012	< 0.013	-	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.06	< 0.07	-	-
Perylene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Phenanthrene	mg/kg dry wt	< 0.014	< 0.012	< 0.013	-	-
Pyrene	mg/kg dry wt	< 0.014	0.018	0.013	-	-
Sample Name:		TBW 0.5 A 12-May-2025	TBW 0.5 B 12-May-2025	TBS 0.5 A 12-May-2025	TBS 0.5 B 12-May-2025	TBN 0.5 A 12-May-2025
Lab Number:		3892810.32	3892810.33	3892810.34	3892810.35	3892810.36
Individual Tests						
TCLP Weight of Sample Taken	g	50	-	-	-	-
TCLP Initial Sample pH	pH Units	7.2	-	-	-	-
TCLP Acid Adjusted Sample pH	pH Units	1.7	-	-	-	-
TCLP Extractant Type*		NaOH/Acetic acid at pH 4.93 +/- 0.05	-	-	-	-
TCLP Extraction Fluid pH	pH Units	5.0	-	-	-	-
TCLP Post Extraction Sample pH	pH Units	5.1	-	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	16	5	7	5	5
Total Recoverable Cadmium	mg/kg dry wt	0.42	0.26	0.57	0.33	0.44
Total Recoverable Chromium	mg/kg dry wt	13	8	10	11	8
Total Recoverable Copper	mg/kg dry wt	31	12	36	25	23
Total Recoverable Lead	mg/kg dry wt	250	48	110	84	53
Total Recoverable Nickel	mg/kg dry wt	16	3	5	8	4
Total Recoverable Zinc	mg/kg dry wt	2,300	1,420	400	159	188
Sample Name:		TBN 0.5 B 12-May-2025	BG01 0-0.15m 12-May-2025	BG02 0-0.15m 12-May-2025	BG03 0-0.15m 12-May-2025	BG04 0-0.15m 12-May-2025
Lab Number:		3892810.37	3892810.38	3892810.39	3892810.40	3892810.41
Individual Tests						
Dry Matter	g/100g as rcvd	-	73	69	76	72
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	-	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.26	-	-	-	-
Total Recoverable Chromium	mg/kg dry wt	7	-	-	-	-
Total Recoverable Copper	mg/kg dry wt	18	-	-	-	-
Total Recoverable Lead	mg/kg dry wt	22	-	-	-	-
Total Recoverable Nickel	mg/kg dry wt	5	-	-	-	-
Total Recoverable Zinc	mg/kg dry wt	72	-	-	-	-

Sample Type: Soil						
Sample Name:		TBN 0.5 B 12-May-2025	BG01 0-0.15m 12-May-2025	BG02 0-0.15m 12-May-2025	BG03 0-0.15m 12-May-2025	BG04 0-0.15m 12-May-2025
Lab Number:		3892810.37	3892810.38	3892810.39	3892810.40	3892810.41
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	5	5	7	35
Total Recoverable Cadmium	mg/kg dry wt	-	0.31	0.23	0.30	0.44
Total Recoverable Chromium	mg/kg dry wt	-	9	7	8	9
Total Recoverable Copper	mg/kg dry wt	-	16	16	19	23
Total Recoverable Lead	mg/kg dry wt	-	21	18.5	22	30
Total Recoverable Mercury	mg/kg dry wt	-	0.12	< 0.10	0.12	0.11
Total Recoverable Nickel	mg/kg dry wt	-	4	5	4	5
Total Recoverable Zinc	mg/kg dry wt	-	61	76	68	117
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
alpha-BHC	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
beta-BHC	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
delta-BHC	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
gamma-BHC (Lindane)	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
cis-Chlordane	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
trans-Chlordane	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
2,4'-DDD	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
4,4'-DDD	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
2,4'-DDE	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
4,4'-DDE	mg/kg dry wt	-	< 0.014	< 0.014	0.013	0.031
2,4'-DDT	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
4,4'-DDT	mg/kg dry wt	-	< 0.014	< 0.014	0.015	0.021
Total DDT Isomers	mg/kg dry wt	-	< 0.09	< 0.09	< 0.08	< 0.08
Dieldrin	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Endosulfan I	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Endosulfan II	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Endosulfan sulphate	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Endrin	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Endrin aldehyde	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Endrin ketone	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Heptachlor	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Heptachlor epoxide	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Hexachlorobenzene	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Methoxychlor	mg/kg dry wt	-	< 0.014	< 0.014	< 0.013	< 0.014
Sample Type: Aqueous						
Sample Name:		TPAG14B 0.7-1.0m [TCLP extract]	TPAG14E 0.7-1.0m [TCLP extract]	TPAG14E 1.0-1.7m [TCLP extract]	TPAG14E 0.7-1.0m [SPLP extrcat]	TPAG14D 0-0.1m [SPLP extract]
Lab Number:		3892810.42	3892810.43	3892810.44	3892810.45	3892810.46
Individual Tests						
Total Boron	g/m³	-	28	-	16.2	0.33
Total Lead	g/m³	0.081	-	6.2	-	-
Sample Name:		TPAG14F 0.15-0.3m [SPLP extract]			TBW 0.5 A [TCLP extract]	
Lab Number:		3892810.47			3892810.48	
Individual Tests						
Total Boron	g/m³	0.72			-	
Total Zinc	g/m³	-			14.7	
Analyst's Comments						
Amended Report: This certificate of analysis replaces report '3892810-SPv2' issued on 10-Jun-2025 at 10:46 am. Reason for amendment: Additional testing added as per clients request.						

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-10, 12-41
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-10, 12-29
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry), gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-10, 12-29, 38-41
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.	0.024 mg/kg dry wt	1-10, 12-29
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).	0.024 mg/kg dry wt	1-10, 12-29
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	30-37
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	38-41
7 Heavy metals plus Boron	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 - 20 mg/kg dry wt	1-10, 12-29
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	38-41
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1-10, 12-29
SPLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1312.	-	7, 13, 17
TCLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1311.	-	3, 13-14, 32
SPLP Profile			
SPLP Sample Weight	Gravimetric. US EPA 1312.	0.1 g	7, 13, 17
SPLP Extractant Type*	US EPA 1312 (Modified for New Zealand conditions to use De-ionised Water unless otherwise specified).	-	7, 13, 17
SPLP Final pH	pH meter. US EPA 1312.	0.1 pH Units	7, 13, 17
TCLP Profile			
TCLP Weight of Sample Taken	Gravimetric. US EPA 1311.	0.1 g	3, 13-14, 32
TCLP Initial Sample pH	pH meter. US EPA 1311.	0.1 pH Units	3, 13-14, 32
TCLP Acid Adjusted Sample pH	pH meter. US EPA 1311.	0.1 pH Units	3, 13-14, 32
TCLP Extractant Type*	US EPA 1311.	-	3, 13-14, 32
TCLP Extraction Fluid pH	pH meter. US EPA 1311.	0.1 pH Units	3, 13-14, 32
TCLP Post Extraction Sample pH	pH meter. US EPA 1311.	0.1 pH Units	3, 13-14, 32
Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	42-48
Total Boron	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.63 g/m ³	43
Total Boron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.063 g/m ³	45-47
Total Lead	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.0021 g/m ³	42, 44
Total Zinc	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.053 g/m ³	48

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

Testing was completed between 23-May-2025 and 27-Jun-2025. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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

Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 5

Client:	Fraser Thomas Limited	Lab No:	3916050	SPv1
Contact:	Elliot Bish	Date Received:	13-Jun-2025	
	C/- Fraser Thomas Limited	Date Reported:	17-Jun-2025	
	PO Box 204006	Quote No:	118001	
	Highbrook	Order No:	33205	
	Auckland 2161	Client Reference:	33205	
		Submitted By:	Elliot Bish	

Sample Type: Soil

Sample Name:	TBN 0.5 C	TBN 0.5 D	TBW 0.5 C	TBW 0.5 D	TBE 0.5 C
	13-Jun-2025	13-Jun-2025	13-Jun-2025	13-Jun-2025	13-Jun-2025
Lab Number:	3916050.1	3916050.2	3916050.3	3916050.4	3916050.5

Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	20	8	4	3	4
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.14	< 0.10	< 0.10	0.17
Total Recoverable Chromium	mg/kg dry wt	11	10	9	9	7
Total Recoverable Copper	mg/kg dry wt	23	15	16	13	16
Total Recoverable Lead	mg/kg dry wt	18.6	19.9	22	19.1	24
Total Recoverable Nickel	mg/kg dry wt	3	3	4	4	3
Total Recoverable Zinc	mg/kg dry wt	63	50	73	53	79

Sample Name:	TBE 0.5 D	TBS 0.5 C	TBS 0.5 D	BG01 0.15-0.3	BG01 0.3-0.5
	13-Jun-2025	13-Jun-2025	13-Jun-2025	13-Jun-2025	13-Jun-2025
Lab Number:	3916050.6	3916050.7	3916050.8	3916050.9	3916050.10

Individual Tests

Dry Matter	g/100g as rcvd	-	-	-	75	74
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Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	8	2	3	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	-	-
Total Recoverable Chromium	mg/kg dry wt	6	8	7	-	-
Total Recoverable Copper	mg/kg dry wt	9	11	10	-	-
Total Recoverable Lead	mg/kg dry wt	11.7	23	17.0	-	-
Total Recoverable Nickel	mg/kg dry wt	2	3	3	-	-
Total Recoverable Zinc	mg/kg dry wt	47	43	31	-	-

Heavy Metals with Mercury, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	-	-	-	3	3
Total Recoverable Cadmium	mg/kg dry wt	-	-	-	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	-	-	-	5	5
Total Recoverable Copper	mg/kg dry wt	-	-	-	9	7
Total Recoverable Lead	mg/kg dry wt	-	-	-	16.2	15.7
Total Recoverable Mercury	mg/kg dry wt	-	-	-	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	-	-	-	2	2
Total Recoverable Zinc	mg/kg dry wt	-	-	-	38	31

Organochlorine Pesticides Screening in Soil

Aldrin	mg/kg dry wt	-	-	-	< 0.014	< 0.014
alpha-BHC	mg/kg dry wt	-	-	-	< 0.014	< 0.014
beta-BHC	mg/kg dry wt	-	-	-	< 0.014	< 0.014
delta-BHC	mg/kg dry wt	-	-	-	< 0.014	< 0.014
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.014	< 0.014
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.014	< 0.014
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.014	< 0.014



This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Soil						
Sample Name:		TBE 0.5 D 13-Jun-2025	TBS 0.5 C 13-Jun-2025	TBS 0.5 D 13-Jun-2025	BG01 0.15-0.3 13-Jun-2025	BG01 0.3-0.5 13-Jun-2025
Lab Number:		3916050.6	3916050.7	3916050.8	3916050.9	3916050.10
Organochlorine Pesticides Screening in Soil						
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.014	< 0.014
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.014	< 0.014
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.014	< 0.014
4,4'-DDE	mg/kg dry wt	-	-	-	< 0.014	< 0.014
2,4'-DDT	mg/kg dry wt	-	-	-	< 0.014	< 0.014
4,4'-DDT	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Total DDT Isomers	mg/kg dry wt	-	-	-	< 0.08	< 0.08
Dieldrin	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Endosulfan I	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Endosulfan II	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Endrin	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Endrin ketone	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Heptachlor	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Methoxychlor	mg/kg dry wt	-	-	-	< 0.014	< 0.014
Sample Name:		BG01 0.5-0.7 13-Jun-2025	BG02 0.15-0.3 13-Jun-2025	BG02 0.3-0.5 13-Jun-2025	BG02 0.5-0.7 13-Jun-2025	BG03 0.15-0.3 13-Jun-2025
Lab Number:		3916050.11	3916050.12	3916050.13	3916050.14	3916050.15
Individual Tests						
Dry Matter	g/100g as rcvd	73	68	76	79	78
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	2	4	2	2	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.19	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	5	7	6	5	7
Total Recoverable Copper	mg/kg dry wt	6	13	7	5	9
Total Recoverable Lead	mg/kg dry wt	16.8	17.3	16.2	15.6	15.4
Total Recoverable Mercury	mg/kg dry wt	< 0.10	0.16	0.15	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	2	3	3	< 2	3
Total Recoverable Zinc	mg/kg dry wt	25	49	26	21	35
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
alpha-BHC	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
beta-BHC	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
delta-BHC	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
cis-Chlordane	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
trans-Chlordane	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
2,4'-DDD	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
4,4'-DDD	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
2,4'-DDE	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
4,4'-DDE	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
2,4'-DDT	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
4,4'-DDT	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Total DDT Isomers	mg/kg dry wt	< 0.09	< 0.09	< 0.08	< 0.08	< 0.08
Dieldrin	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Endosulfan I	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Endosulfan II	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Endosulfan sulphate	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Endrin	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Endrin aldehyde	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Endrin ketone	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Heptachlor	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013

Sample Type: Soil						
Sample Name:		BG01 0.5-0.7 13-Jun-2025	BG02 0.15-0.3 13-Jun-2025	BG02 0.3-0.5 13-Jun-2025	BG02 0.5-0.7 13-Jun-2025	BG03 0.15-0.3 13-Jun-2025
Lab Number:		3916050.11	3916050.12	3916050.13	3916050.14	3916050.15
Organochlorine Pesticides Screening in Soil						
Heptachlor epoxide	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Hexachlorobenzene	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Methoxychlor	mg/kg dry wt	< 0.014	< 0.015	< 0.013	< 0.013	< 0.013
Sample Name:		BG03 0.3-0.5 13-Jun-2025	BG03 0.5-0.7 13-Jun-2025	BG04 0.15-0.3 13-Jun-2025	BG04 0.3-0.5 13-Jun-2025	BG04 0.5-0.7 13-Jun-2025
Lab Number:		3916050.16	3916050.17	3916050.18	3916050.19	3916050.20
Individual Tests						
Dry Matter	g/100g as rcvd	78	82	73	65	71
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	12	< 2	5	6	7
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	0.17	0.22	0.13
Total Recoverable Chromium	mg/kg dry wt	8	3	8	9	10
Total Recoverable Copper	mg/kg dry wt	21	4	16	36	21
Total Recoverable Lead	mg/kg dry wt	24	10.5	19.5	14.8	16.2
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	0.16	0.26	0.17
Total Recoverable Nickel	mg/kg dry wt	40	< 2	3	4	4
Total Recoverable Zinc	mg/kg dry wt	20	12	58	94	59
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
alpha-BHC	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
beta-BHC	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
delta-BHC	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
4,4'-DDD	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
4,4'-DDE	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
2,4'-DDT	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
4,4'-DDT	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.08	< 0.09	< 0.10	< 0.09
Dieldrin	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Endosulfan I	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Endosulfan II	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Endrin	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Endrin ketone	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Heptachlor	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Methoxychlor	mg/kg dry wt	< 0.013	< 0.012	< 0.014	< 0.016	< 0.014
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.013	-	-	-	-
Acenaphthene	mg/kg dry wt	< 0.013	-	-	-	-
Anthracene	mg/kg dry wt	< 0.013	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.013	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.031	-	-	-	-

Sample Type: Soil						
Sample Name:		BG03 0.3-0.5 13-Jun-2025	BG03 0.5-0.7 13-Jun-2025	BG04 0.15-0.3 13-Jun-2025	BG04 0.3-0.5 13-Jun-2025	BG04 0.5-0.7 13-Jun-2025
Lab Number:		3916050.16	3916050.17	3916050.18	3916050.19	3916050.20
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.031	-	-	-	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.013	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.013	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	-	-	-	-
Chrysene	mg/kg dry wt	< 0.013	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	-	-	-	-
Fluoranthene	mg/kg dry wt	< 0.013	-	-	-	-
Fluorene	mg/kg dry wt	< 0.013	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	-	-	-	-
Naphthalene	mg/kg dry wt	< 0.07	-	-	-	-
Perylene	mg/kg dry wt	< 0.013	-	-	-	-
Phenanthrene	mg/kg dry wt	< 0.013	-	-	-	-
Pyrene	mg/kg dry wt	< 0.013	-	-	-	-

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-20
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	16
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-8
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	9-20
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	9-20
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	16
Dry Matter	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	9-20
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.	0.024 mg/kg dry wt	16
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).	0.024 mg/kg dry wt	16

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

Testing was completed between 13-Jun-2025 and 17-Jun-2025. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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

A handwritten signature in blue ink, appearing to read 'G Corban', is positioned above the printed name.

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

Certificate of Analysis

Client Fraser Thomas LTD
Client Contact Elliot Bish
Phone Number 021 225 4572
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IANZ# 1308

Certificate ID	Q-01479	Date Sampled ²	23/05/2025
Samples Taken By ²	EB/BLM	Date Sample(s) Received	26/05/2025
Project Reference ²	33097	Date Sample(s) Analysed & Issued	03/06/2025
Site Address ²	33097		
Location Sample Analysed	Eurofins Focus 35 O'Rorke Road, Penrose, Auckland 1061		

Qualitative Analysis of Asbestos

Lab ID	Sample ID ²	Sample Details ²	Sample type	Sample size (g) ²	Fibres Identified
1	TPAG11A 0-0.2m	-	Soils	607	ORF, NAD
2	TPAG11B 0-0.05m	-	Soils	573	ORF, NAD
3	TPAG11B 0.05-0.3m	-	Soils	803	ORF, NAD
4	TPAG11C 0-0.2m	-	Soils	624	ORF, NAD
5	TPAG11D 0-0.1m	-	Soils	654	ORF, NAD
6	TPAG11D 0.1-0.5m	-	Soils	554	ORF, NAD
7	TBE 0.5 A	-	Soils	586	ORF, NAD
8	TBE 0.5 B	-	Soils	628	ORF, NAD
9	TBW 0.5 A	-	Soils	361	ORF, NAD
10	TBW 0.5 B	-	Soils	435	ORF, NAD
11	TBN 0.5 A	-	Soils	404	ORF, NAD
12	TBN 0.5 B	-	Soils	618	ORF, NAD
13	TBS 0.5 A	-	Soils	393	ORF, NAD
14	TBS 0.5 B	-	Soils	544	ORF, NAD
15	TPAG14A 0-0.2m	-	Soils	703	ORF, NAD
16	TPAG14A 0.2-0.65m	-	Soils	691	ORF, NAD
17	TPAG14A 0.65-0.85m	-	Soils	555	ORF, NAD
18	TPAG14B 0-0.15m	-	Soils	602	ORF, NAD
19	TPAG14B 0.15-0.7m	-	Soils	634	ORF, NAD
20	TPAG14B 0.7-1.0m	-	Soils	564	ORF, NAD
21	TPAG14C 0-0.15m	-	Soils	574	ORF, NAD
22	TPAG14C 0.15-0.45m	-	Soils	653	ORF, NAD
23	TPAG14C 0.45-0.85m	-	Soils	524	ORF, NAD
24	TPAG14D 0-0.1m	-	Soils	661	ORF, NAD
25	TPAG14D 0.1-0.3m	-	Soils	582	AMO, ORF
26	TPAG14D 0.3-0.55m	-	Soils	672	ORF, NAD
27	TPAG14E 0-0.15m	-	Soils	691	ORF, NAD
28	TPAG14E 0.7-1.0m	-	Soils	730	ORF, NAD
29	TPAG14E 1.0-1.7m	-	Soils	645	ORF, NAD
30	TPAG14F 0-0.15m	-	Soils	595	ORF, NAD
31	TPAG14F 0.15-0.3m	-	Soils	601	CHR, ORF
32	TPAG14F 0.3-0.5m	-	Soils	599	ORF, NAD
33	TPAG14G 0-0.15m	-	Soils	619	ORF, NAD
34	TPAG14G 0.15-0.6m	-	Soils	562	ORF, NAD
35	TPAG14G 0.6-2m	-	Soils	532	ORF, NAD
36	TPAG15A 0-0.4m	-	Soils	597	ORF, NAD
37	TPAG15B 0-0.1m	-	Soils	621	ORF, NAD
38	TPAG15B 0.1-0.5m	-	Soils	571	ORF, NAD
39	TPAG15C 0-0.1m	-	Soils	651	ORF, NAD
40	TPAG15C 0.1-0.3m	-	Soils	538	ORF, NAD

Opinions and interpretations expressed herein are outside the scope of Eurofins | Focus IANZ accreditation

Analytical Notes	-
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Fibre Identification Key:

*	See Analytical Notes	ORF	Organic Fibre
CHR	Chrysotile (White Asbestos)	SMF	Synthetic Mineral Fibre
AMO	Amosite (Brown / Grey Asbestos)	NFD	No Fibres Detected
CRO	Crocidolite – (Blue Asbestos)	NAD	No Asbestos Detected
UMF	Unknown Mineral Fibre		

Scope of Accreditation:

1. The analytical comments marked (*) stated in the semi-quantitative analysis and the calculations in the semi-quantitative analysis of asbestos in soil are beyond Eurofins | Focus scope of accreditation.
2. Eurofins | Focus did not carry out any sampling, and the data presented are based on the samples submitted. Data supplied by the client is indicated with superscript ² and may impact the results.
3. This certificate should be read in its entirety and shall not be reproduced except in full, without written approval of the laboratory.

***Semi Quantitative Analysis of Soil**
***Semi Quantitative Analysis of Asbestos in Soil**

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
1	TPAG1 1A 0-0.2m	607.4	563.4	7.2	(>10mm) Fraction	154.3	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	247.8	-	NAD	-					
					(<2mm) Fraction	161.3	-	NAD	-					
2	TPAG1 1B 0-0.05m	572.7	387.3	32.4	(>10mm) Fraction	147.3	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	152.4	-	NAD	-					
					(<2mm) Fraction	87.6	-	NAD	-					
3	TPAG1 1B 0.05-0.3m	803.4	759.2	5.5	(>10mm) Fraction	252.5	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	354.3	-	NAD	-					
					(<2mm) Fraction	152.4	-	NAD	-					
4	TPAG1 1C 0-0.2m	624.4	540.8	13.4	(>10mm) Fraction	146.2	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	243.5	-	NAD	-					
					(<2mm) Fraction	151.1	-	NAD	-					
5	TPAG1 1D 0-0.1m	654.2	547.9	16.2	(>10mm) Fraction	150.0	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	184.8	-	NAD	-					
					(<2mm) Fraction	213.1	-	NAD	-					

***Semi Quantitative Analysis of Soil**
***Semi Quantitative Analysis of Asbestos in Soil**

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
6	TPAG1 1D 0.1-0.5m	554.0	427.7	22.8	(>10mm) Fraction	94.8	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	179.4	-	NAD	-					
					(<2mm) Fraction	153.5	-	NAD	-					
7	TBE 0.5 A	585.6	403.2	31.1	(>10mm) Fraction	107.2	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	155.6	-	NAD	-					
					(<2mm) Fraction	140.4	-	NAD	-					
8	TBE 0.5 B	628.2	475.3	24.3	(>10mm) Fraction	68.8	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	171.3	-	NAD	-					
					(<2mm) Fraction	235.2	-	NAD	-					
9	TBW 0.5 A	360.9	203.5	43.6	(>10mm) Fraction	74.3	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	62.0	-	NAD	-					
					(<2mm) Fraction	67.2	-	NAD	-					
10	TBW 0.5 B	434.9	288.3	33.7	(>10mm) Fraction	95.4	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	108.8	-	NAD	-					
					(<2mm) Fraction	84.1	-	NAD	-					

***Semi Quantitative Analysis of Soil**
***Semi Quantitative Analysis of Asbestos in Soil**

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
11	TBN 0.5 A	404.3	280.2	30.7	(>10mm) Fraction	77.6	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	95.8	-	NAD	-					
					(<2mm) Fraction	106.8	-	NAD	-					
12	TBN 0.5 B	617.7	444.1	28.1	(>10mm) Fraction	153.7	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	158.3	-	NAD	-					
					(<2mm) Fraction	132.1	-	NAD	-					
13	TBS 0.5 A	393.1	261.2	33.6	(>10mm) Fraction	31.3	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	86.2	-	NAD	-					
					(<2mm) Fraction	143.7	-	NAD	-					
14	TBS 0.5 B	543.7	399.8	26.5	(>10mm) Fraction	118.0	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	135.3	-	NAD	-					
					(<2mm) Fraction	146.5	-	NAD	-					
15	TPAG1 4A 0-0.2m	702.8	514.1	26.8	(>10mm) Fraction	119.0	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	227.4	-	NAD	-					
					(<2mm) Fraction	167.7	-	NAD	-					

***Semi Quantitative Analysis of Soil**
***Semi Quantitative Analysis of Asbestos in Soil**

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
16	TPAG1 4A 0.2-0.65m	691.4	597.3	13.6	(>10mm) Fraction	300.5	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	206.7	-	NAD	-					
					(<2mm) Fraction	90.1	-	NAD	-					
17	TPAG1 4A 0.65-0.85m	554.8	423.7	23.6	(>10mm) Fraction	107.6	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	206.7	-	NAD	-					
					(<2mm) Fraction	109.4	-	NAD	-					
18	TPAG1 4B 0-0.15m	601.7	457.8	23.9	(>10mm) Fraction	116.6	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	203.7	-	NAD	-					
					(<2mm) Fraction	137.5	-	NAD	-					
19	TPAG1 4B 0.15-0.7m	634.2	550.9	13.1	(>10mm) Fraction	227.8	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	230.2	-	NAD	-					
					(<2mm) Fraction	92.9	-	NAD	-					
20	TPAG1 4B 0.7-1.0m	564.3	426.7	24.4	(>10mm) Fraction	140.9	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	193.4	-	NAD	-					
					(<2mm) Fraction	92.4	-	NAD	-					

*Semi Quantitative Analysis of Soil

*Semi Quantitative Analysis of Asbestos in Soil

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
21	TPAG1 4C 0-0.15m	573.6	440.7	23.2	(>10mm) Fraction	88.7	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	204.5	-	NAD	-					
					(<2mm) Fraction	147.5	-	NAD	-					
22	TPAG1 4C 0.15-0.45m	652.6	556.7	14.7	(>10mm) Fraction	160.0	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	254.7	-	NAD	-					
					(<2mm) Fraction	142.0	-	NAD	-					
23	TPAG1 4C 0.45-0.85m	524.0	394.1	24.8	(>10mm) Fraction	120.5	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	191.8	-	NAD	-					
					(<2mm) Fraction	81.8	-	NAD	-					
24	TPAG1 4D 0-0.1m	661.2	487.4	26.3	(>10mm) Fraction	129.1	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	230.5	-	NAD	-					
					(<2mm) Fraction	127.8	-	NAD	-					
25	TPAG1 4D 0.1-0.3m	582.2	392.5	32.6	(>10mm) Fraction	71.5	-	NAD	-	0.0002	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	167.4	0.0001	FFF	100					
					(<2mm) Fraction	153.6	0.0001	FFF	100					

***Semi Quantitative Analysis of Soil**
***Semi Quantitative Analysis of Asbestos in Soil**

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
26	TPAG1 4D 0.3-0.55m	672.3	516.7	23.1	(>10mm) Fraction	204.7	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	199.4	-	NAD	-					
					(<2mm) Fraction	112.6	-	NAD	-					
27	TPAG1 4E 0-0.15m	690.6	518.8	24.9	(>10mm) Fraction	105.8	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	235.2	-	NAD	-					
					(<2mm) Fraction	177.8	-	NAD	-					
28	TPAG1 4E 0.7-1.0m	729.6	558.1	23.5	(>10mm) Fraction	118.2	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	214.9	-	NAD	-					
					(<2mm) Fraction	225.0	-	NAD	-					
29	TPAG1 4E 1.0-1.7m	644.9	476.9	26.1	(>10mm) Fraction	314.7	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	109.8	-	NAD	-					
					(<2mm) Fraction	52.4	-	NAD	-					
30	TPAG1 4F 0-0.15m	595.1	421.9	29.1	(>10mm) Fraction	86.0	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	197.8	-	NAD	-					
					(<2mm) Fraction	138.1	-	NAD	-					

***Semi Quantitative Analysis of Soil**
***Semi Quantitative Analysis of Asbestos in Soil**

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
31	TPAG1 4F 0.15-0.3m	601.2	501.9	16.5	(>10mm) Fraction	208.4	-	NAD	-	0.0017	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	183.5	0.0028	INS	60					
					(<2mm) Fraction	110.0	-	NAD	-					
32	TPAG1 4F 0.3-0.5m	598.5	449.5	24.9	(>10mm) Fraction	232.3	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	156.8	-	NAD	-					
					(<2mm) Fraction	60.4	-	NAD	-					
33	TPAG1 4G 0-0.15m	619.2	515.6	16.7	(>10mm) Fraction	166.6	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	238.7	-	NAD	-					
					(<2mm) Fraction	110.3	-	NAD	-					
34	TPAG1 4G 0.15-0.6m	562.4	425.2	24.4	(>10mm) Fraction	93.5	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	195.9	-	NAD	-					
					(<2mm) Fraction	135.8	-	NAD	-					
35	TPAG1 4G 0.6-2m	531.7	401.1	24.6	(>10mm) Fraction	78.2	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	166.5	-	NAD	-					
					(<2mm) Fraction	156.4	-	NAD	-					

***Semi Quantitative Analysis of Soil**
***Semi Quantitative Analysis of Asbestos in Soil**

Date sample(s) received: 26/05/2025

Date sample(s) analysed: 03/06/2025

Lab ID	Sample ID	As received weight (g)	Dry weight (g)	Moisture (%)	Fraction size (mm)	Dry fraction weight (g)	Asbestos product weight (g)	Asbestos product type	Percentage of asbestos in product ^a	Total mass of Asbestos in sample ^b	Bonded Asbestos containing material in sample (% w/w) ^c	Asbestos as FA (% w/w) ^d	Asbestos as AF (% w/w) ^e	Total Fibrous Asbestos + Asbestos Fines (Friable) (% w/w) ^f
36	TPAG1 5A 0-0.4m	597.4	442.6	25.9	(>10mm) Fraction	103.7	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	224.3	-	NAD	-					
					(<2mm) Fraction	114.6	-	NAD	-					
37	TPAG1 5B 0-0.1m	620.6	463.5	25.3	(>10mm) Fraction	73.6	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	259.3	-	NAD	-					
					(<2mm) Fraction	130.6	-	NAD	-					
38	TPAG1 5B 0.1-0.5m	570.7	432.1	24.3	(>10mm) Fraction	142.5	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	183.8	-	NAD	-					
					(<2mm) Fraction	105.8	-	NAD	-					
39	TPAG1 5C 0-0.1m	651.2	557.9	14.3	(>10mm) Fraction	228.7	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	222.2	-	NAD	-					
					(<2mm) Fraction	107.0	-	NAD	-					
40	TPAG1 5C 0.1-0.3m	538.2	413.4	23.2	(>10mm) Fraction	277.6	-	NAD	-	-	-	<0.001	<0.001	<0.001
					(10-2mm) Fraction	89.9	-	NAD	-					
					(<2mm) Fraction	45.9	-	NAD	-					

Analysis Method:

Samples submitted have been analysed to determine the mass fraction of asbestos in soil using low powered stereo microscopy followed by polarised light microscopy (PLM) including dispersion staining techniques as documented in (AS 4964-2004), Method for the qualitative identification of asbestos in bulk samples, BRANZ, New Zealand Guidelines for Assessing and Managing Asbestos in Soils:2017.

Product Identification Key:

BTP	Bituminous Product	LSE	Loose Fill Insulation
CMP	Cement Product	NAD	No Asbestos Detected
COM	Composite	PPR	Paper Product
FFF	Free Fibres	RPL	Reinforced Plastics
FIB	Fibre Board	TXC	Textured Coating
GCP	Gaskets (compressed)	VNP	Vinyl Products
GRW	Gaskets (rope/woven)	VPP	Vinyl with paper backing
INS	Insulation	WVP	Woven Product

Interpretation of Key:

^a Percentage of Asbestos in product is adopted from HSG 264 - 2012, Asbestos the survey guide, Appendix 2, ACMS in buildings and categorized in our internal Technical Procedure (NPM-TP02) for Qualitative and Semi-Quantitative analysis of asbestos in soil. A dash (-) denotes that there was no asbestos found in that fraction.

^b Total Mass of Asbestos is the sum mass of asbestos-by-asbestos type in product type(^a) plus the mass of free fibre asbestos. A dash (-) denotes that there was no total mass of asbestos calculated asbestos found in that fraction.

^c Bonded Asbestos Containing Material in the greater than 10mm fraction as percentage of the total sample (% w/w). A dash (-) denotes that there was no bonded asbestos containing materials found in that fraction.

^d Asbestos as Fibrous Asbestos (FA) in greater than 10mm fraction as percentage of total sample (% w/w).

^e Asbestos as Asbestos Fines (AF) in less than 10mm fraction as a percentage of total sample (% w/w).

^f Total Friable Asbestos combining Fibrous Asbestos and Asbestos Fines as the percentage weight for weight of the total sample (% w/w).

Sample History

Where samples are submitted/analysed over several days, the last extraction date is reported. If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time. Client samples are disposed of 1 month after analysis

Description

AS4964-2004 and in-house
Method NPM -TP02

Testing Site

Auckland

Extracted

03/06/2025

Holding Time

Indefinite

Comments

Asbestos Counter/Identifier:

Elsie Xu Analyst-Asbestos

Emily Wang Analyst-Asbestos

**Emily Wang****Senior Analyst-Asbestos (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

Measurement uncertainty of test data is available on request or please [click here](#).

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