

File No.: 39630

17 September 2025

Sovereign Palms Ltd.  
PO BOX 13 349  
**CHRISTCHURCH 8141**

**Attention: Sean Monaghan**

Email: monaghan@suburbanestates.co.nz

Dear Sean,

## **Topsoil investigation report – Stages 6-14 Oakbridge Subdivision (subdivision of Lot 4000 DP 575457 & Lots 4-6 DP 23089)**

### **1.0 Introduction and scope**

The Oakbridge residential subdivision is located on land with the previous address of 47 Hawkins Road and 7 Selkirk Place, Marshland, Christchurch (herein referred to as 'the site'). Soil sampling was undertaken within Stage 6 of the Oakbridge subdivision by Davis Ogilvie & Partners Limited (Davis Ogilvie) in June 2025, on behalf of Sovereign Palms Ltd.

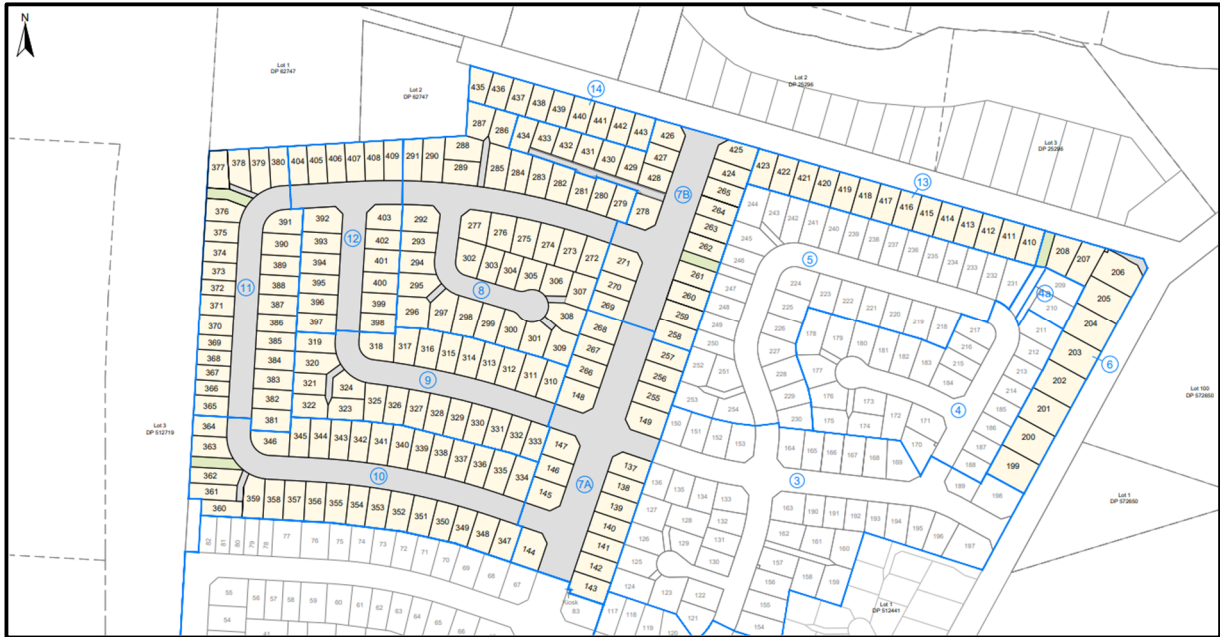
The soil sampling was completed to assess the recently placed site won topsoil across the site which previously contained trace elements (heavy metals) at concentrations above background levels, predominately copper and zinc. Soil sampling in stages 7-14 will be undertaken once earthworks have been completed and topsoil has been placed in those stages.

Davis Ogilvie previously completed a Detailed Site Investigation (DSI) of the Oakbridge subdivision in 2017<sup>1</sup>. The DSI found concentrations of heavy metals, organochlorine pesticides (OCPs), and polycyclic aromatic hydrocarbons (PAHs) at and above the adopted background criteria were present across the site. Specifically, copper was present at concentrations exceeding background over the majority of the subdivision area. DDT, arsenic, chromium, and zinc were also detected at concentrations above background in a number of samples in locations around the subdivision.

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<sup>1</sup> Davis Ogilvie report dated 26 May 2017; Detailed Site Investigation Report, Oakbridge, Reference 34300.

Hotspot areas with contaminants concentrations exceeding the National Environmental Standard for Soil Contamination (NESCS) for residential 10% produce have been remediated, and a validation report has been produced which is separate to this report. The subject of this report is the widespread, elevated copper concentrations within the topsoil. Following remediation of the hotspot areas, the original topsoil across the Oakbridge subdivision was stripped, stockpiled, and later respread as the final stage of earthworks development. Therefore, the topsoil is considered to be well mixed. A plan showing Stages 6-14 of the Oakbridge subdivision is shown in Figure 1.



**Figure 1: Extract from the Oakbridge Scheme Plan - Stages 6-14 (overall plan) (DWG 354/K). Not to scale.**

Soil samples were collected by Davis Ogilvie in June 2025 in Stage 6 (Lots 199 – 208). Samples were taken from the upper 100 to 150 mm of topsoil. The soil sampling methodology included the collection of four soil samples per residential lot which were analysed for a suite of heavy metals. Composite samples (a combination of the four samples per lot) were created by the laboratory, and each composite sample was then analysed by the laboratory for organochlorine pesticides (OCPs). The results were compared to the NESCS for residential 10% produce and background levels established by Environment Canterbury (ECan)<sup>2</sup> and ambient concentrations for OCPs<sup>3</sup>.

<sup>2</sup> ECan (2007). Background concentrations of selected trace elements in Canterbury Soils. Christchurch Gley and Recent Soils, Level 2-Table 2.

<sup>3</sup> Ministry for the Environment (MfE) (1998) Ambient concentrations of selected organochlorines in soils.

## 1.1 Assessment Methodology

The following investigation and assessment methodology was undertaken:

- Soil sample locations evenly distributed within each residential lot to gain a suitable representation of the topsoil.
- Visual and olfactory inspection of each sample for indicators of contamination.
- Soil samples were collected directly by hand and from ground surface to a depth of 150 mm below existing ground level (EGL).
- To reduce the potential for cross contamination, each sample was collected using disposable nitrile gloves that were discarded following the collection of each sample.
- All field work and sampling were undertaken in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils.
- All samples were placed in laboratory supplied containers, which were then sealed, labelled with a unique identifier, and placed in chilled containers prior to transportation to the laboratory.
- Approximately four individual soil samples were taken per lot. All samples on each lot were subsequently composited by the laboratory and analysis was undertaken on that composited sample.
- Samples were transported to Hill Laboratory (Hill Labs) (an International Accredited New Zealand (IANZ) accredited laboratory) under the standard chain of custody procedures for laboratory analysis of potential contaminants of concern.
- Following receipt of the samples by Hill Labs, selected soil samples were scheduled for a selection of analytes including heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, and Zn) and Organochlorine Pesticides (OCPs).
- Assessment of soil concentrations for contaminants of concern with applicable standards and soil acceptance criteria for the protection of human health and the environment.

The residential lots that were sampled are shown in Figure 2.

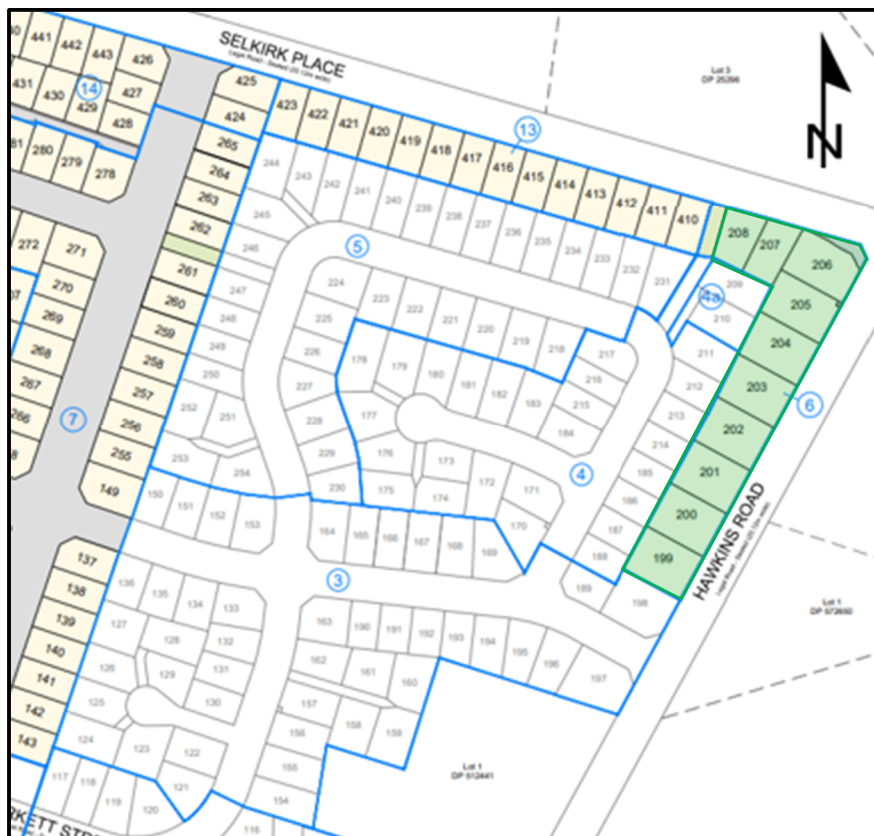


Figure 2: Modified extract from the Oakbridge Scheme Plan (overall plan) (DWG OSP.1/A) showing sampled areas as part of this investigation. Sampling was undertaken in lots shaded in green.

## 2.0 Regulatory framework and assessment criteria

The NES for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations under the Resource Management Act (1991) came into effect on 1 January 2012. The NES Regulations apply to all land where a detailed site investigation exists that demonstrates that any contaminants in or on the piece of land are above background concentrations. The Davis Ogilvie (May 2017) DSI<sup>4</sup> identified trace elements to be consistently present in the topsoil across the site.

An assessment of topsoil present on site was completed to evaluate the topsoil concentrations post stripping, stockpiling, and re-spreading to ensure suitable for residential land use and to evaluate possible NES Regulation and soil disposal implications for future landowners.

The NES introduced 12 soil contaminant standards (SCSs) for priority contaminants for the protection of human health in a variety of land use scenarios. The NES requires that the Contaminated Land Management Guideline No.2 – Hierarchy and Application in New Zealand of Environmental Guideline Values be used where an NESCS is not available. The ‘Residential 10%’ land use scenario has been adopted in this assessment.

<sup>4</sup> Davis Ogilvie report dated 26 May 2017: Detailed Site Investigation Report, Oakbridge, Reference 34300

Background levels for metal concentrations in soils in the area were obtained from ECan online GIS – Trace Level 2 concentrations. The values for the Regional GLEY and RECENT soil groups were adopted.

### 3.0 Analytical results

Laboratory reports are attached to this letter as are the assessment tables with results tabulated and compared against the relevant assessment criteria. The Stage 6 topsoil analytical results can be summarised as follows:

- All composite soil samples from the 10 lots (Lot 199 to Lot 208) contain copper concentrations that exceed the background concentration for this soil type.
- All organochlorine pesticides (OCPs) analysed for were below ambient concentrations for the region.
- No analytes were detected in concentrations above Tier 1 soil contaminant standards protective of human health.

Canterbury Maps shows a boundary between two different background levels crossing the subdivision: these are 'GLEY' and 'RECENT'. The background levels for these two soil types are provided in the ECan 2007 background concentrations report<sup>5</sup>. Both GLEY (n = 6) and RECENT (n = 18) background levels are shown in Table 1 (attached). However, since all topsoil on site has been stockpiled, respread, and therefore mixed, it is not appropriate to compare the results spatially and the results have been compared to the highest background level RECENT.

#### 3.1 Quality assurance and quality control

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

- All fieldwork was managed by a Suitably Qualified and Experienced Practitioner (SQEP), and this report has been reviewed by a SQEP, as required by the NESCS.
- The use of standard sample registers and chain of custody records for all samples.
- Each soil sample was given a unique identification number, which consisted of a project number, lot number location and sample identifier (e.g., 199\_1 to 4, denoting lot number and sample number per lot). In addition, the sample date was also included. Each composite sample was named with the lot number the samples were obtained from.
- All analysis was completed by Hill Laboratories who are an IANZ accredited laboratory.

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<sup>5</sup> ECan (2007). Background concentrations of selected trace elements in Canterbury Soils. Christchurch Gley Recent Soils, Level 2-Table 2.

## 4.0 2017 DSI

Heavy metal data from topsoil across stages 1 to 14 was collected in 2017, a total of 252 to 297 samples, depending on the specific heavy metal. Averages of this data were calculated to give an indication of post-soil mixing concentrations. Samples collected within soil remediation areas were not included in the dataset as this topsoil has been removed from site. Soil validation areas are detailed in the November 2023 Soil Validation Report<sup>6</sup>. The data shows that all analysed metals, apart from copper and zinc have an average concentration below the established background values. It is noted that two background values cross the site, therefore the greatest values have been selected for comparison. All heavy metal concentrations are below Residential SCS.

**Table 1: Summary of 2017 DSI Topsoil Data (n = 248 to 295)**

Heavy Metal	Average (mean)	95% UCL	Background (Gley)	Background (Recent)	Residential SCS
Arsenic	10	10.4	11	12.58	20
Cadmium	0.19	0.22	0.28	0.19	3
Chromium 2	19.9	20.2	19.3	22.7	460
Copper	<b>53.9</b>	59.3	16.4	20.3	>10 000
Lead	31.8	34.7	19.3	40.96	210
Mercury	0.01	0.01	0.07	0.11	310
Nickel	16.1	16.5	16.1	20.7	400
Zinc	<b>105.9</b>	122.8	77.1	93.94	7400

BOLD: Above background

Background 1 = ECan (2007). Background concentrations of selected trace elements in Canterbury Soils. Gley Regional Soils, Level 2-Table 2.

Background 2 = ECan (2007). Background concentrations of selected trace elements in Canterbury Soils. Recent Regional Soils, Level 2-Table 2.

<sup>6</sup> Davis Ogilvie & Partners Ltd. (November 2023), Site Validation Report – Version 5: 1 Selkirk Place And 47 Hawkins Road, Stages 3 – 6 Oakbridge Subdivision (Lots 4 and 5 DP 23089 and Lot 4000 DP 575457). Ref. 39630.

## 5.0 Conclusions

Based on the topsoil sampling results across Stage 6 it is considered that the topsoil is suitable for residential land use and that the risk to human health is acceptable. However, as heavy metal results for copper consistently exceed background levels, the topsoil on site does not meet the definition of 'cleanfill'. Topsoil that leaves site must be taken to an accredited facility authorised to receive it.

According to the NES Regulations (8.3), the expected soil disturbance / removal volumes associated with the residential development of each lot is likely to exceed the criteria for a permitted activity and a resource consent is required to do so.

A global consent for the removal of contaminated soil is currently being applied for by Suburban Estates from Christchurch City Council to remove the soil from the applicable lots. The site management plan required as a likely condition of this global resource consent should be followed when soil disturbance and / or removal volumes exceed the permitted activity allowance.

Based on the 2017 topsoil analysis, it is likely that metal concentrations within the mixed topsoil placed within stages 7-14 will have average concentrations below the established background values, apart from copper and zinc.

This report shall be updated once samples from placed topsoil in stages 7-14 have been analysed.

## 6.0 Closure

If you have any questions regarding the above, please do not hesitate to contact the undersigned.

Yours faithfully,

**Davis Ogilvie & Partners Ltd.**



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**Gareth Oddy**

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### Enclosed:

- Oakbridge Stage 6: Soil Analytical Results - Tables 1 - 2
- Laboratory Results

## Limitations

This report has been prepared on the specific instructions of Sovereign Palms Ltd. Only Sovereign Palms Ltd. and the Local and Regional Territorial Authorities are entitled to rely upon this report. Davis Ogilvie & Partners Ltd. accepts no liability to anyone other than Sovereign Palms Ltd. in any way in relation to this report and the content of it and any direct or indirect effect this report may have. No warranty is included—either expressed or implied—that the actual conditions will conform to the assessments contained in this report. Davis Ogilvie & Partners Ltd. does not consider anyone else relying on this report or that it will be used for any other purpose.

**Table 1: Oakbridge Stage 6: Soil Analytical Results (Heavy Metals) - 39630**

Composite samples for Lot	Depth (m)	Hills Laboratory No.	Sample description	Sample date	Heavy Metals (mg/kg dry weight)						
					Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
<b>Background Concentrations (Gley, n=6)<sup>1</sup></b>					11	0.28	19.3	16.425	19.3	16.1	77.1
<b>Background Concentrations (Recent, n=18)</b>					12.58	0.19	22.7	20.3	40.96	20.7	93.94
<b>NES:CS SCS for Residential (10% Produce) Land Use Scenario</b>					20	3	460	>10 000	210	400	7400
<b>Australian and New Zealand Guidelines for Fresh and Marine Water Quality - GV-high (mg/kg)<sup>6</sup></b>					70	10	370	270	220	52	410
<b>199</b>	<b>0.0-0.15</b>	3916130.41	Topsoil	Jun-25	10	0.14	20	<b>34</b>	28	17	91
<b>200</b>	<b>0.0-0.15</b>	3916130.42	Topsoil	Jun-25	11	0.11	21	<b>33</b>	27	17	88
<b>201</b>	<b>0.0-0.15</b>	3916130.43	Topsoil	Jun-25	9	0.13	21	<b>27</b>	28	18	89
<b>202</b>	<b>0.0-0.15</b>	3916130.44	Topsoil	Jun-25	11	0.12	21	<b>24</b>	33	18	86
<b>203</b>	<b>0.0-0.15</b>	3916130.45	Topsoil	Jun-25	10	0.12	20	<b>41</b>	26	17	88
<b>204</b>	<b>0.0-0.15</b>	3916130.46	Topsoil, silt, trace gravel	Jun-25	10	0.15	20	<b>50</b>	29	17	93
<b>205</b>	<b>0.0-0.15</b>	3916130.47	Topsoil, silt, trace gravel	Jun-25	11	0.13	21	<b>55</b>	27	17	93
<b>206</b>	<b>0.0-0.15</b>	3916130.48	Topsoil, silt, trace gravel	Jun-25	<b>13</b>	0.13	21	<b>38</b>	28	18	93
<b>207</b>	<b>0.0-0.15</b>	3916130.49	Topsoil, silt, trace gravel	Jun-25	10	0.12	20	<b>35</b>	24	16	84
<b>208</b>	<b>0.0-0.15</b>	3916130.50	Topsoil, silt, trace gravel	Jun-25	9	0.11	19	<b>27</b>	22	16	84

1. ECan (2007). Background concentrations of selected trace elements in Canterbury Soils. Christchurch Gley Recent Soils, Level 2-Table 2.

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 residential (10% produce) have been selected.

3. National Environment Protection Council (NEPC) (2013). National Environmental Protection Measure (Assessment of Site Contamination) as amended in 2013 Schedule B1, Health Investigation Levels (HIL) for soil contaminants based on Residential land use. Table 1A (1).

4. Assumes soil pH of 5.

5. Criteria for Chromium VI were conservatively selected.

6. Australian and New Zealand Guidelines for Fresh and Marine Water Quality Guidelines. Recommended default guideline values for toxicants in sediment. Guideline values - High.

**BOLD** Value exceeds the adopted background concentration

**BOLD:** Value exceeds the ANZG-GV-high criteria/adopted background concentration

**ND** Not detected

- Not analysed

Table 2: Oakbridge Stage 6: Soil Analytical Results (Organochlorine Pesticides) - 39630

Lot No.	Ambient Concentrations <sup>1</sup>	NES:CS SCS for Residential (10%) Land Use Scenario	199	200	201	202	203	204	205	206	207	208
			0.0-0.15	0.0-0.15	0.0-0.15	0.0-0.15	0.0-0.15	0.0-0.15	0.0-0.15	0.0-0.15	0.0-0.15	0.0-0.15
Sample Depth (m)			Jun-25	Jun-25	Jun-25	Jun-25	Jun-25	Jun-25	Jun-25	Jun-25	Jun-25	Jun-25
Sample Date												
Laboratory sample number			3916130.41	3916130.42	3916130.43	3916130.44	3916130.45	3916130.46	3916130.47	3916130.48	3916130.49	3916130.5
Organochlorine Pesticides in Soil (mg/kg dry wt)												
Aldrin	-	0.029 <sup>7</sup>	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
alpha-BHC	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
beta-BHC	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
delta-BHC	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
gamma-BHC (Lindane)	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
cis-Chlordane	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
trans-Chlordane	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
2,4'-DDD	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
4,4'-DDD	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
2,4'-DDE	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
4,4'-DDE	0.23	-	0.035	0.018	< 0.014	0.016	< 0.013	0.017	0.029	< 0.014	< 0.014	< 0.014
2,4'-DDT	0.0235	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
4,4'-DDT	0.172	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Total DDT Isomers	0.431	70	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.09	< 0.09
Dieldrin	0.00131	2.6	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endosulfan I	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endosulfan II	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endosulfan sulphate	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endrin	-	18 <sup>7</sup>	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endrin aldehyde	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endrin ketone	-	-	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Heptachlor	-	0.10 <sup>8</sup>	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Heptachlor epoxide	-	0.05 <sup>7</sup>	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Hexachlorobenzene	-	0.3 <sup>7</sup>	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Methoxychlor	-	310 <sup>7</sup>	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014

1. MfE (1998) Ambient concentrations of selected organochlorines in soils.

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 residential land use have been selected.

3. National Environment Protection Council (NEPC) (2013). National Environmental Protection Measure (Assessment of Site Contamination) as amended in 2013 Schedule B1, Health Investigation Levels (HIL) for soil contaminants based on Residential land use. Table 1A (1).

4. Assumes soil pH of 5.

5. Criteria for Chromium VI were conservatively selected.

6. Ministry for the Environment, 1999 revised 2011. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Module 4 - Tier 1 Soil Screening Criteria. Commercial/industrial land use, sand soil type, surface (<1 m) contamination.

**BOLD** Value exceeds the adopted ambient concentration  
 < Value below the laboratory limit of detection  
 - Value Not Available

## Certificate of Analysis

Page 1 of 3

<b>Client:</b> Davis Ogilvie & Partners Limited	<b>Lab No:</b> 3916130	SPV1
<b>Contact:</b> Andy Bunce	<b>Date Received:</b> 13-Jun-2025	
C/- Davis Ogilvie & Partners Limited	<b>Date Reported:</b> 18-Jun-2025	
PO Box 589	<b>Quote No:</b> 82763	
Addington	<b>Order No:</b>	
Christchurch 8140	<b>Client Reference:</b> 39630	
	<b>Submitted By:</b> Andy Bunce	

### Sample Type: Soil

Sample Name:	Composite of 39630_199-1, 39630_199-2, 39630_199-3 & 39630_199-4 13-Jun-2025	Composite of 39630_200-1, 39630_200-2, 39630_200-3 & 39630_200-4 13-Jun-2025	Composite of 39630_201-1, 39630_201-2, 39630_201-3 & 39630_201-4 13-Jun-2025	Composite of 39630_202-1, 39630_202-2, 39630_202-3 & 39630_202-4 13-Jun-2025	Composite of 39630_203-1, 39630_203-2, 39630_203-3 & 39630_203-4 13-Jun-2025
<b>Lab Number:</b>	3916130.41	3916130.42	3916130.43	3916130.44	3916130.45

### Individual Tests

Dry Matter	g/100g as rcvd	75	77	76	76	75
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### Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	10	11	9	11	10
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.11	0.13	0.12	0.12
Total Recoverable Chromium	mg/kg dry wt	20	21	21	21	20
Total Recoverable Copper	mg/kg dry wt	34	33	27	24	41
Total Recoverable Lead	mg/kg dry wt	28	27	28	33	26
Total Recoverable Nickel	mg/kg dry wt	17	17	18	18	17
Total Recoverable Zinc	mg/kg dry wt	91	88	89	86	88

### Organochlorine Pesticides Screening in Soil

Aldrin	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
alpha-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
beta-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
delta-BHC	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
gamma-BHC (Lindane)	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
cis-Chlordane	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
trans-Chlordane	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
2,4'-DDD	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
4,4'-DDD	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
2,4'-DDE	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
4,4'-DDE	mg/kg dry wt	0.035	0.018	< 0.014	0.016	< 0.013
2,4'-DDT	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
4,4'-DDT	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Dieldrin	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Endosulfan I	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Endosulfan II	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Endosulfan sulphate	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Endrin	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Endrin aldehyde	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Endrin ketone	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Heptachlor	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Heptachlor epoxide	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Hexachlorobenzene	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 0.013
Methoxychlor	mg/kg dry wt	< 0.013	< 0.013	< 0.014	< 0.013	< 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						
<b>Sample Name:</b>		Composite of 39630_204-1, 39630_204-2, 39630_204-3 & 39630_204-4 13-Jun-2025	Composite of 39630_205-1, 39630_205-2, 39630_205-3 & 39630_205-4 13-Jun-2025	Composite of 39630_206-1, 39630_206-2, 39630_206-3 & 39630_206-4 13-Jun-2025	Composite of 39630_207-1, 39630_207-2, 39630_207-3 & 39630_207-4 13-Jun-2025	Composite of 39630_208-1, 39630_208-2, 39630_208-3 & 39630_208-4 13-Jun-2025
<b>Lab Number:</b>		3916130.46	3916130.47	3916130.48	3916130.49	3916130.50
Individual Tests						
Dry Matter	g/100g as rcvd	74	73	73	72	73
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	10	11	13	10	9
Total Recoverable Cadmium	mg/kg dry wt	0.15	0.13	0.13	0.12	0.11
Total Recoverable Chromium	mg/kg dry wt	20	21	21	20	19
Total Recoverable Copper	mg/kg dry wt	50	55	38	35	27
Total Recoverable Lead	mg/kg dry wt	29	27	28	24	22
Total Recoverable Nickel	mg/kg dry wt	17	17	18	16	16
Total Recoverable Zinc	mg/kg dry wt	93	93	93	84	84
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
alpha-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
beta-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
delta-BHC	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
cis-Chlordane	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
trans-Chlordane	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
2,4'-DDD	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
4,4'-DDD	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
2,4'-DDE	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
4,4'-DDE	mg/kg dry wt	0.017	0.029	< 0.014	< 0.014	< 0.014
2,4'-DDT	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
4,4'-DDT	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Total DDT Isomers	mg/kg dry wt	< 0.08	< 0.08	< 0.08	< 0.09	< 0.09
Dieldrin	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endosulfan I	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endosulfan II	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endosulfan sulphate	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endrin	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endrin aldehyde	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Endrin ketone	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Heptachlor	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Heptachlor epoxide	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Hexachlorobenzene	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014
Methoxychlor	mg/kg dry wt	< 0.014	< 0.014	< 0.014	< 0.014	< 0.014

## Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill 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).	-	41-50
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	41-50
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	41-50

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
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	41-50
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	1-40

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

Testing was completed between 13-Jun-2025 and 18-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.

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