EC Otago

Environmental Consultants Otago Ltd

Assessment Report
94 Holyhead Street, Outram

for

Balmoral Developments (Outram) Limited

September 2017

Environmental Consultants Otago Ltd
Environmental and Contaminated Site Assessment ▪ Planning and Urban Design ▪ Landscape Architecture
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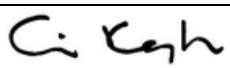
Reviewed By:	Ciaran Keogh	
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Client: Balmoral Developments (Outram) Limited
Job Ref.: 66-17 Balmoral
Date: September 2017

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Abbreviations

DCC	Dunedin City Council
DDT	Dichlorodiphenyltrichloroethane
HAIL	Hazardous Activities and Industries List
MfE	New Zealand Ministry for the Environment
NES Soil	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
OCP	Organochlorine Pesticides
ORC	Otago Regional Council
PSI	Preliminary Site Investigation
SCS	Soil Contaminant Standards
SGV	Soil Guideline Values

1 Introduction

1.1 Background and Objectives

This assessment report has been prepared to provide additional information relating to the potential for soil contamination on the property at 94 Holyhead Street, Outram. The property was the subject of a Preliminary Site Investigation[1] (PSI) prepared by Spiire in January 2013, to assess the suitability of the former market garden site for a proposed Residential subdivision.

The 2013 PSI found that the site had been subject to activities described in the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL). The HAIL is a compilation of activities and industries that are considered to have the potential to cause land contamination as a result of hazardous substance use, storage or disposal. The PSI identified market gardening (HAIL A10), but stated that no historical evidence of HAIL activity was found as no evidence of persistent pesticide bulk storage or use of pesticides was found in anecdotal evidence or limited sampling.

If a HAIL activity or industry is being, has been or is more likely than not to have been undertaken on a property, then the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES)[2] apply when five specific activities (including soil disturbance, subdivision or change of use) take place on the property.

The 2013 PSI sampling results were very limited, with four subsamples collected from the 6.3518 ha property being composited into one sample for analysis. The composite sample was analysed for heavy metals and pesticide residues, the main contaminants associated with market gardening. The PSI reported that concentrations of all analytes measured were below guidelines protective of human health.

The PSI concluded that no contaminants are present at levels above soil guideline values appropriate to residential use, inclusive of the scenario of dietary consumption of up to 10% produce grown on site, and that there are no triggers to indicate that the site is contaminated. However, the report did note that due to the preliminary nature of the investigation, it was not possible to fully exclude the possibility of contamination. The limited sampling in the PSI was considered insufficient by the Otago Regional Council (ORC) to conclude the entire property was free of contamination, particularly given the long history of market gardening from the 1940's to 2004. The Dunedin City Council (DCC) issued consent LUC-2017-132 on 22 May 2017 permitting the disturbance of soils associated with the subdivision (SUB-2017-32) under the NES. While there are no conditions in the consent relating to the HAIL status of the land, it does note a duty by the developer to undertake the management of soil contamination appropriately.

Balmoral Developments (Outram) Limited have engaged Environmental Consultants Otago Limited (EC Otago) to undertake extensive soil sampling across the property to resove the limitations of the sampling undertaken in support of the PSI, and to provide this assessment report to present the results of the additional smapling. The objective of this report is to investigate the potential for ground contamination associated with the former HAIL activity identified in the PSI.

[1] Spiire New Zealand Limited, January 2013. *Balmoral Developments Limited - Preliminary Site Investigation Report 94 Holyhead Street, Outram*.
[2] Ministry for the Environment, 2012. *Users' Guide - National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*.

1.2 Scope of Work

The following scope of work was undertaken:

- Collection of soil samples at <10cm depth at 56 locations in a grid across the site.
- Analysis of both composite and individual samples for the priority heavy metals and Organochlorine Pesticides (OCPs).
- Preparation of this assessment report, which summarises our findings.

Specifically, this report assesses the following:

- The extent of any contamination within the site; and
- Compliance with the Residential Soil Contaminant Standards (SCS) and Soil Guideline Values (SGVs).

1.3 Limitations and Applicability

Services for this project have been performed in accordance with current professional standards for environmental site assessments. No guarantees are either expressed or implied. This report does not attempt to fulfil the requirements of legal due diligence.

There is no investigation that is thorough enough to preclude the presence of materials at the property that presently, or in the future, may be considered hazardous. As regulatory criteria are subject to change, a property status with respect to contamination that is presently considered to be acceptable may, in the future, become subject to different regulatory standards that cause the property to become unacceptable for existing or proposed land use activities.

Any recommendations, opinions or findings stated in this report are based on circumstances, facts and assessment criteria as they existed at the time that we performed the work and on data obtained from the investigations and site observations as detailed in this report. Opinions and judgments expressed in this report, which are based on an understanding and interpretation of assessment standards should not be construed as legal opinions. This report and the information it contains have been prepared solely for the use of Balmoral Developments (Outram) Limited. Any reliance on this report by other parties shall be at such party's own risk without prior agreement to the contrary.

2 Site Overview

2.1 Site Identification

The property is shown in Figure 1, and the details of the property are given in Table 1. For the purposes of this report, the site is defined as the area outlined with a turquoise line in Figure 1, being the entire property.

Table 1: Property Details.

Owner	Balmoral Developments (Outram) Limited
Address	94 Holyhead Street, Outram
Legal description	LOT 2 DP 20759
Certificate of Title	12B/346
Area	6.3518 ha
District Plan / zoning	Partly Residential 5 and Partly Rural in the Dunedin City District Plan; Partly Township and Settlement and Partly Rural Taieri Plains in the Proposed Second Generation Dunedin City District Plan

Figure 1: The site at 94 Holyhead Street, Outram, outlined with a turquoise line (Source Aerial photography DCC, Jan/Feb 2013, CC BY 3.0 NZ).

2.2 Site Use History Summary and Proposed Future Use

The property is located on the northern periphery of Outram. The land has historically been used for agricultural purposes, and from the mid 1940's was used for market gardening. The full history is detailed in the PSI by Spiire.

The site is proposed to be subdivided in two stages, as shown in Figure 2.

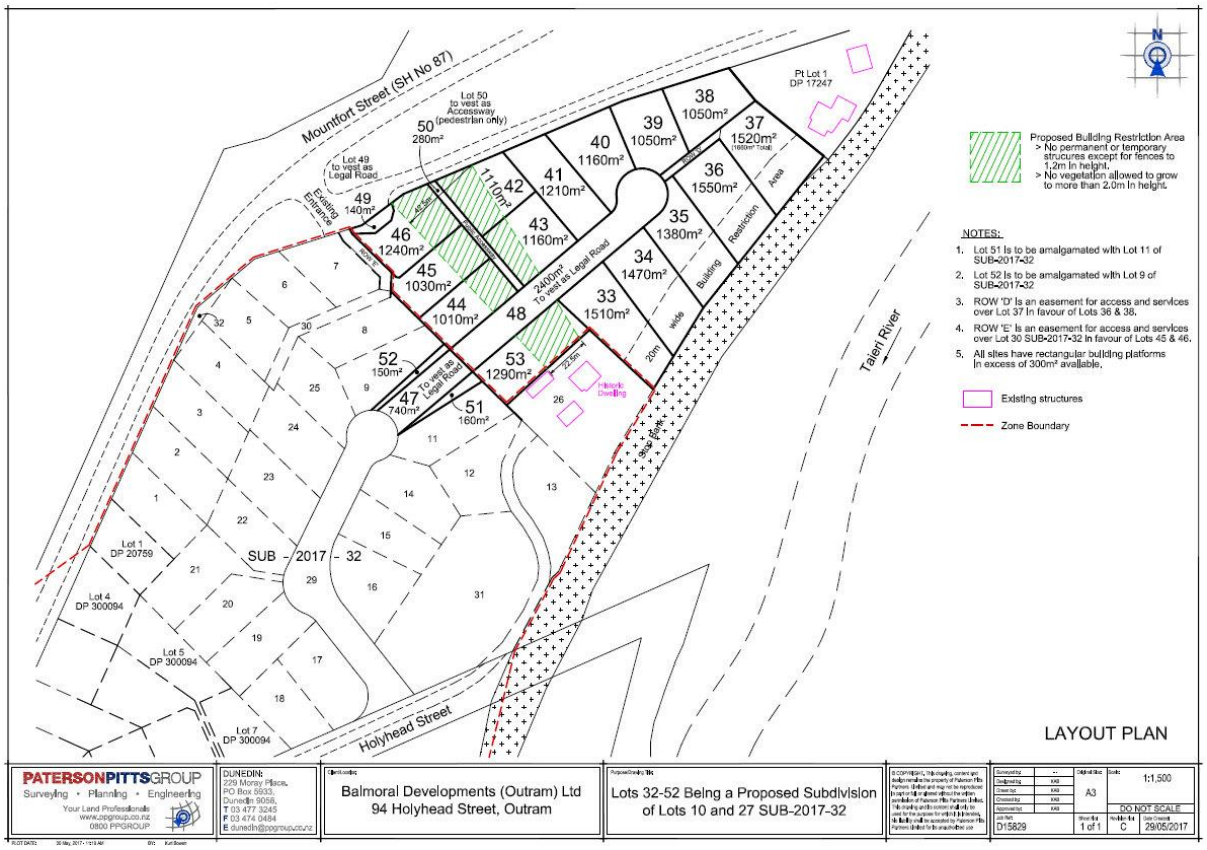

Figure 2: The proposed subdivision plan (Source Paterson Pitts Group).

3 Site Inspection and Soil Sampling

3.1 Overview

An EC Otago Senior Environmental Planner conducted a site visit and inspection of the site and its immediate vicinity on 16 August 2017. The site is predominantly in two grazed/mowed paddocks separated by a hedgerow. The original homestead and a farm shed are close to the centre of the property. A small area in the centre is cultivated, as shown in Figure 3A. The site is relatively flat and appears, from viewing of historic google earth imagery, to have been converted into the two grassed paddocks between February 2003 and January 2005. The 2003 Google Earth image shows several different areas of cultivation (Figure 4).

The site is bounded to the north-west by Outram-Mosgiel Road/Mountfort Street, a Strategic Road, and to the south-east by the Taieri River.

The 2013 PSI sampling was collected from roughly the centre of each paddock (two samples per paddock).

For this study, additional sampling, analysis, and interpretation of results has been undertaken in order to provide an evidentiary basis from which to assess the site's status with respect to the potential risks for human exposure, in accordance with the NES Soil.

Figure 3: The site showing (A) the cultivated area and the northern paddock; (B) the homestead; and (C) the southern paddock and farm shed (16 August 2017).

Figure 4: The site in 2003, showing several different areas of cultivation (Source Google Earth, DigitalGlobe, 27 February 2003).

3.2 Sampling Plan

Soil samples were collected using a hybrid of judgemental and grid sampling with a spacing of approximately 30 m. All samples were collected from shallow (<10cm) soils, and sampling was designed to incorporate different horticultural areas evident from the 2003 aerial images as well as areas around the farm buildings, locations considered more prone to hotspot contamination, as shown in Figure 5. In total, 57 locations were sampled and analysed as 16 individual samples and 13 composite samples consisting of 3 subsamples each.

Figure 5: Site sampling plan showing the location of the 57 soil samples, as recorded using a handheld Garmin s64 GPS unit with a locational accuracy of ±5 m.

3.3 Sampling Methods

Samples were collected using freshly gloved hands and an Edelman geologists 70*200 mm hand auger. Samples were transferred to into clean, contaminant-free glass containers provided by the testing laboratory and immediately placed into a chilly bin cooled with icepacks. Sampling locations were recorded using a handheld Garmin s64 GPS unit with a locational accuracy of ±5 m. During sampling, the date, time and location of collection was recorded. Containers were labelled with sample name, date and time on both label and lid as the samples were taken. The chain of custody form was completed during field operations, and samples were immediately dispatched to the analytical laboratory by courier. The samples were received and analysed at Eurofins Laboratories Limited, an International Accreditation New Zealand accredited laboratory.

Composite samples were prepared by the testing laboratory from individual subsamples. Composite samples were analysed for arsenic, copper, lead and OCPs, while individual samples were analysed for arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc in addition to OCPs.

4 Results from Sampling and Analysis

4.1 Soil Acceptance Criteria

As part of the process of assessing risk from potential contaminants, results from analysis must be compared to SCSs which reflect acceptable risk levels of contamination in soil for the appropriate use scenarios. For some analytes, the MfE has not established SCSs. In this case, guideline values from other sources may be used according to an established hierarchy specified by the MfE[3]. For contaminants not assigned an SCS in the NES, the MfE hierarchy was used to select suitable SGVs for comparative purposes. The SCS's applied are those recognized as priority contaminants by the MfE's Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health[4].

A portion of the site is located is zoned Residential, with the remainder being zoned Rural. However, the proposed future use is residential, hence the Residential SCSs/SGVs, which include 10% homegrown produce consumption, were applied. As per the current guidelines, when considering composite samples, the SCSs and SGVs were adjusted to reflect the use of compositing techniques (divided by three, which was the number of sub-samples per composite).

4.2 Results of Analysis

The results are summarised in Table 2, and the full laboratory analysis reports are attached as Appendix A. The only pesticides detected included dichlorodiphenyltrichloroethane (DDT) residues, reported as the sum of DDT residues (∑DDT), and Dieldrin. Other OCP results are not shown in Table 2.

The results for all individual samples, the site average and the 95% upper confidence limit (UCL) were all below the relevant SCS/SGVs.

The results for some composite samples (BAL 1, BAL 6, BAL 15 and BAL 16) show an exceedance of the Composite SCS for arsenic, and these are likely technical exceedances, i.e. artefactual. Under the current guidelines, SCSs and SGVs must be adjusted for the use of composite samples. While ensuring that high levels of contaminants in one or more subsample are not masked by the

[3] Ministry for the Environment, 2011. *Contaminated Land Management Guidelines No. 2: Hierarchy and application in New Zealand of environmental guideline values (revised 2011).*
[4] Ministry for the Environment, 2011. *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health*.

averaging effect of compositing, this can generate the problem of a technical exceedance. Table 2 show the composite arsenic concentrations are in close agreement with individual results, indicating the composite results are reflecting an average that is close to the composite SCS, and the exceedances are technical.

The results across the site show a generalised low level of DDT contamination, within the range typically reported for market gardens of <0.01 to 2.66 mg/kg[5], as well as elevated arsenic, lead and zinc associated with the farm buildings (Samples BAL 10, BAL 21, BAL 22, and BAL 26), relative to the rest of the site and predicted backgrounds. These areas are more prone to contamination hotspots, dur to the increased likelihood of spillage in the vicinity.

As the results are below the Residential SCSs/SGVs, this indicates acceptable risk for residential use of the site.

5 Site Characterisation

5.1 Type and Extent of Environmental Contamination

Sampling and analysis for the applicable HAIL contaminants as identified in the PSI was conducted, and by the terms of the NES Soil there is no evidence from this of contamination exceeding the Residential acceptance criteria being present in the site soils analysed.

5.2 Conceptual Site Model and Exposure Routes

The primary exposure route for the contamination is through direct contact, ingestion and inhalation. The contaminant levels presented by the sampling and analysis do not exceed the relevant Residential SCSs or SGVs within the site, and therefore presents acceptable risk for residential use.

6 Summary and Conclusions

The following summarises the results from EC Otago's assessment of the site:

- Historical evidence of HAIL land use was found;
- Sampling and analysis of the subdivision has previously been undertaken, and sampling and analysis was performed in the course of this investigation;
- Soil samples were collected at 57 locations from the top 10 cm of the site soils in a grid pattern. These were analysed for priority metals and OCPs; and
- All analytes were found to be at acceptable levels or below the limits of detection.

Based on the information provided within this report, this assessment concludes that the site meets the current standards for residential use, and acceptable risk to human health, and confirms that it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land, as described herein. The sampling results indicate that a contaminated soil management plan is not required.

[5] Landcare Research, 2015. *Background soil concentrations of selected trace elements and organic contaminants in New Zealand*. https://lris.scinfo.org.nz/layer/48470-pbc-predicted-background-soil-concentrations-new-zealand

Table 2. Summary of analysis of soils at Street, Mosgiel.

Sample[A]	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	∑DDT	Dieldrin
Individual Samples										
BAL 2	6.5	< 0.4	8.7	9.8	11	< 0.1	9.1	39	0.31	< 0.01
BAL 7	6.4	< 0.4	9.8	9.9	10	< 0.1	8.7	39	0.7	< 0.01
BAL 9	5.4	< 0.4	9.2	11	15	< 0.1	7.8	43	0.19	< 0.01
BAL 10	8	0.5	18	24	53	0.2	11	110	1.59	0.04
BAL 11	6.7	< 0.4	13	20	17	< 0.1	11	56	0.65	< 0.01
BAL 12 B	2.7	-	-	11	10	-	-	-	0.2	< 0.01
BAL 12 C	4.7	-	-	18	16	-	-	-	0.28	< 0.01
BAL 16 A	4.8	-	-	36	18	-	-	-	0.41	< 0.01
BAL 18 A	< 2	-	-	16	8.4	-	-	-	0.13	< 0.01
BAL 18 B	8.3	< 0.4	11	14	12	-	10	51	-	-
BAL 18 C	8.7	< 0.4	10	12	11	-	10	45	-	-
BAL 21	8.6	< 0.4	15	21	34	0.1	12	190	0.13	< 0.01
BAL 22	9.1	< 0.4	10	20	32	0.1	9.8	76	0.53	< 0.01
BAL 23	7.5	< 0.4	11	26	24	0.2	10	91	0.81	< 0.01
BAL 24	7.8	< 0.4	13	23	17	< 0.1	11	64	0.13	< 0.01
BAL 25	6.2	< 0.4	11	27	22	< 0.1	10	81	0.13	< 0.01
BAL 26	19	< 0.4	13	38	40	0.1	13	400	0.77	< 0.01
Average	7.5	0.5	11.7	19.8	20.6	0.1	10.3	99	0.46	0.04
RSD	47%	n/a	22%	43%	60%	39%	13%	101%	86%	n/a
UCL	9.4	n/a	13.3	24.2	27.0	0.2	11.1	159	0.68	n/a
Composite Samples										
BAL 1 A - C	**7.4**	-	-	12	13	-	-	-	0.11	< 0.01
BAL 3 A - C	6.7	-	-	11	11	-	-	-	0.28	< 0.01
BAL 4 A - C	6.3	-	-	10	12	-	-	-	0.32	< 0.01
BAL 5 A - C	7	-	-	11	12	-	-	-	0.37	< 0.01
BAL 6 A - C	**8.4**	< 0.4	12	14	23	-	11	59	-	-
BAL 8 A - C	6.6	-	-	23	20	-	-	-	0.45	0.01
BAL 13 A - C	4.8	-	-	15	14	-	-	-	0.13	0.01
BAL 14 A - C	6	-	-	17	16	-	-	-	0.71	< 0.01
BAL 15 A - C	**8.9**	-	-	25	28	-	-	-	1.15	< 0.01
BAL 16 A - C	**7.9**	-	-	27	23	-	-	-	0.54	< 0.01
BAL 17 A - C	6.9	-	-	15	11	-	-	-	0.55	< 0.01
BAL 19 A - C	5.7	-	-	15	11	-	-	-	0.42	< 0.01
BAL 20 A - C	6	-	-	17	11	-	-	-	0.24	< 0.01
Average	6.8	< 0.4	12	16	16	-	11	59	0.44	0.01
RSD	17%	n/a	n/a	34%	37%	n/a	n/a	n/a	65%	0%
SCS/SGV	20[B]	3[B]	460[B]	>10,000[B]	210[B]	310[B]	400[C]	7,400[C]	70[B]	2.6
Composite SCS/SGV	7[B]	1[B]	153[B]	>3,333[B]	70[B]	103[B]	133[C]	2,467[C]	23[B]	0.9[B]
Predicted Background[D]										
Median	2.38	0.065	11.76	11.23	7.11	-	6.24	23.61	<0.03	-
U95	9.97	0.33	56.88	48.14	25.83	-	35.15	97.97	0.05	-

[A] Results for total concentration analysis, 95% upper confidence limit (UCL), and SCSs/SGVs in mg/kg dry weight; relative standard deviation (RSD) in %. Sample numbers are as marked in Figure 5. n/a is not applicable, – indicates "no value". Values in grey boxes exceed the relevant SCS/SGV.

[B] MfE, 2012. *Users' Guide, National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.* Wellington. Cr SCS is reported as Cr(VI). Soil contaminant standards (SCSs) reflect a *Standard Residential No Produce* use scenario.

[C] National Environment Protection Council (Australia), 2013. *National Environment Protection (Assessment of Site Contamination) Measure 1999.* This is a Health Investigation Level targeted at human health for low density residential use.

[D] Landcare Research, 2015. *Background soil concentrations of selected trace elements and organic contaminants in New Zealand.* Predicted median and 95th percentile background concentration. Chemical4 Factor: mudstone Pakihi. Also refer: (https://lris.scinfo.org.nz/layer/48470-pbc-predicted-background-soil-concentrations-new-zealand). Note: cadmium, zinc and ∑DDT predictions based on low sample numbers (n <30), and are considered less reliable.

7 References

Spiire New Zealand Limited, January 2013. *Balmoral Developments Limited - Preliminary Site Investigation Report 94 Holyhead Street, Outram*. Project No. 704132

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National Environment Protection Council (Australia), 2013. *National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013)*. (https://www.legislation.gov.au/Details/F2013C00288).

Appendix A - Eurofins Results

eurofins | mgt

Certificate of Analysis

EC Otago Ltd
PO BOX 5522
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New Zealand 9058

NATA Accredited
Accreditation Number
Site Number

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Berni Chapman**

Report **559143-S-V2**
Project name
Received Date Aug 17, 2017

Client Sample ID			**BAL 1 COMPOSITE**	**BAL 2**	**BAL 3 COMPOSITE**	**BAL 4 COMPOSITE**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21595**	**Z17-Au21596**	**Z17-Au21597**	**Z17-Au21598**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDD	0.01	mg/kg	0.02	0.08	0.06	0.07
4.4'-DDE	0.01	mg/kg	0.04	0.13	0.08	0.12
4.4'-DDT	0.01	mg/kg	0.05	0.10	0.14	0.13
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	79	75	97	93
Tetrachloro-m-xylene (surr.)	1	%	69	65	79	81
Heavy Metals						
Arsenic	2	mg/kg	7.4	-	6.7	6.3
Copper	5	mg/kg	12	-	11	10
Lead	5	mg/kg	13	-	11	12

Client Sample ID			BAL 1 COMPOSITE	BAL 2	BAL 3 COMPOSITE	BAL 4 COMPOSITE
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21595**	**Z17-Au21596**	**Z17-Au21597**	**Z17-Au21598**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit				
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	-	6.5	-	-
Cadmium	0.4	mg/kg	-	< 0.4	-	-
Chromium	5	mg/kg	-	8.7	-	-
Copper	5	mg/kg	-	9.8	-	-
Lead	5	mg/kg	-	11	-	-
Mercury	0.1	mg/kg	-	< 0.1	-	-
Nickel	5	mg/kg	-	9.1	-	-
Zinc	5	mg/kg	-	39	-	-
% Moisture	1	%	17	9.1	17	16

Client Sample ID			BAL 5 COMPOSITE	BAL 7	BAL 8 COMPOSITE	BAL 9
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21599**	**Z17-Au21601**	**Z17-Au21602**	**Z17-Au21603**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	0.03	0.04	< 0.01
4.4'-DDD	0.01	mg/kg	0.06	0.12	0.06	0.04
4.4'-DDE	0.01	mg/kg	0.12	0.23	0.15	0.06
4.4'-DDT	0.01	mg/kg	0.19	0.32	0.20	0.09
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.1	< 0.1	< 0.1
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	92	86	89	103
Tetrachloro-m-xylene (surr.)	1	%	72	73	71	76

Client Sample ID			BAL 5 COMPOSITE	BAL 7	BAL 8 COMPOSITE	BAL 9
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21599**	**Z17-Au21601**	**Z17-Au21602**	**Z17-Au21603**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	7.0	-	6.6	-
Copper	5	mg/kg	11	-	23	-
Lead	5	mg/kg	12	-	20	-
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	-	6.4	-	5.4
Cadmium	0.4	mg/kg	-	< 0.4	-	< 0.4
Chromium	5	mg/kg	-	9.8	-	9.2
Copper	5	mg/kg	-	9.9	-	11
Lead	5	mg/kg	-	10	-	15
Mercury	0.1	mg/kg	-	< 0.1	-	< 0.1
Nickel	5	mg/kg	-	8.7	-	7.8
Zinc	5	mg/kg	-	39	-	43
% Moisture	1	%	17	34	18	15

Client Sample ID			BAL 10	BAL 11	BAL 13 COMPOSITE	BAL 14 COMPOSITE
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21604**	**Z17-Au21605**	**Z17-Au21607**	**Z17-Au21608**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	0.03	< 0.01	< 0.01	0.02
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	0.16	0.04	< 0.01	0.04
4.4'-DDD	0.01	mg/kg	0.19	0.10	0.03	0.08
4.4'-DDE	0.01	mg/kg	0.64	0.18	0.03	0.23
4.4'-DDT	0.01	mg/kg	0.57	0.33	0.07	0.34
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	0.04	< 0.01	0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			BAL 10	BAL 11	BAL 13 COMPOSITE	BAL 14 COMPOSITE
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			Z17-Au21604	Z17-Au21605	Z17-Au21607	Z17-Au21608
Date Sampled			Aug 16, 2017	Aug 16, 2017	Aug 16, 2017	Aug 16, 2017
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
Dibutylchlorendate (surr.)	1	%	140	108	133	100
Tetrachloro-m-xylene (surr.)	1	%	117	79	80	79
Heavy Metals						
Arsenic	2	mg/kg	-	-	4.8	6.0
Copper	5	mg/kg	-	-	15	17
Lead	5	mg/kg	-	-	14	16
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	8.0	6.7	-	-
Cadmium	0.4	mg/kg	0.5	< 0.4	-	-
Chromium	5	mg/kg	18	13	-	-
Copper	5	mg/kg	24	20	-	-
Lead	5	mg/kg	53	17	-	-
Mercury	0.1	mg/kg	0.2	< 0.1	-	-
Nickel	5	mg/kg	11	11	-	-
Zinc	5	mg/kg	110	56	-	-
% Moisture	1	%	19	18	24	17

Client Sample ID			BAL 15 COMPOSITE	BAL 16 COMPOSITE	BAL 17 COMPOSITE	BAL 19 COMPOSITE
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			Z17-Au21609	Z17-Au21610	Z17-Au21611	Z17-Au21613
Date Sampled			Aug 16, 2017	Aug 16, 2017	Aug 16, 2017	Aug 16, 2017
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	0.04	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	0.06	0.03	0.02	0.01
4.4'-DDD	0.01	mg/kg	0.12	0.09	0.09	0.07
4.4'-DDE	0.01	mg/kg	0.46	0.16	0.18	0.12
4.4'-DDT	0.01	mg/kg	0.47	0.26	0.26	0.22
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			BAL 15 COMPOSITE	BAL 16 COMPOSITE	BAL 17 COMPOSITE	BAL 19 COMPOSITE
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			Z17-Au21609	Z17-Au21610	Z17-Au21611	Z17-Au21613
Date Sampled			Aug 16, 2017	Aug 16, 2017	Aug 16, 2017	Aug 16, 2017
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	140	103	95	91
Tetrachloro-m-xylene (surr.)	1	%	121	80	72	69
Heavy Metals						
Arsenic	2	mg/kg	8.9	7.9	6.9	5.7
Copper	5	mg/kg	25	27	15	15
Lead	5	mg/kg	28	23	11	11
% Moisture	1	%	17	19	18	19

Client Sample ID			BAL 20 COMPOSITE	BAL 21	BAL 22	BAL 23
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			Z17-Au21614	Z17-Au21615	Z17-Au21616	Z17-Au21617
Date Sampled			Aug 16, 2017	Aug 16, 2017	Aug 16, 2017	Aug 16, 2017
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	0.07	0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	0.03	0.08
4.4'-DDD	0.01	mg/kg	0.05	0.03	0.16	0.11
4.4'-DDE	0.01	mg/kg	0.07	0.05	0.05	0.20
4.4'-DDT	0.01	mg/kg	0.12	0.05	0.22	0.41
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.1	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	83	105	101	140
Tetrachloro-m-xylene (surr.)	1	%	66	78	75	108

Client Sample ID			BAL 20 COMPOSITE	BAL 21	BAL 22	BAL 23
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21614**	**Z17-Au21615**	**Z17-Au21616**	**Z17-Au21617**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	6.0	-	-	-
Copper	5	mg/kg	17	-	-	-
Lead	5	mg/kg	11	-	-	-
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	-	8.6	9.1	7.5
Cadmium	0.4	mg/kg	-	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	-	15	10	11
Copper	5	mg/kg	-	21	20	26
Lead	5	mg/kg	-	34	32	24
Mercury	0.1	mg/kg	-	0.1	0.1	0.2
Nickel	5	mg/kg	-	12	9.8	10
Zinc	5	mg/kg	-	190	76	91
% Moisture	1	%	19	23	19	20

Client Sample ID			BAL 24	BAL 25	BAL 26	BAL 12B
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21618**	**Z17-Au21619**	**Z17-Au21620**	**Z17-Au21640**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	0.05	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	0.09	< 0.01
4.4'-DDD	0.01	mg/kg	0.03	0.03	0.13	0.04
4.4'-DDE	0.01	mg/kg	0.03	0.05	0.15	0.05
4.4'-DDT	0.01	mg/kg	0.07	0.05	0.35	0.11
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	0.03	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	0.03	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Client Sample ID			BAL 24	BAL 25	BAL 26	BAL 12B
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			Z17-Au21618	Z17-Au21619	Z17-Au21620	Z17-Au21640
Date Sampled			Aug 16, 2017	Aug 16, 2017	Aug 16, 2017	Aug 16, 2017
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
Dibutylchlorendate (surr.)	1	%	83	93	93	106
Tetrachloro-m-xylene (surr.)	1	%	69	76	74	83
Heavy Metals						
Arsenic	2	mg/kg	-	-	-	2.7
Copper	5	mg/kg	-	-	-	11
Lead	5	mg/kg	-	-	-	10
Metals M8 (NZ MfE)						
Arsenic	2	mg/kg	7.8	6.2	19	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	-
Chromium	5	mg/kg	13	11	13	-
Copper	5	mg/kg	23	27	38	-
Lead	5	mg/kg	17	22	40	-
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.1	-
Nickel	5	mg/kg	11	10.0	13	-
Zinc	5	mg/kg	64	81	400	-
% Moisture	1	%	23	20	20	18

Client Sample ID			BAL 12C	BAL 16A	BAL 18A
Sample Matrix			Soil	Soil	Soil
Eurofins | mgt Sample No.			Z17-Au21641	Z17-Au21651	Z17-Au21657
Date Sampled			Aug 16, 2017	Aug 16, 2017	Aug 16, 2017
Test/Reference	LOR	Unit			
Organochlorine Pesticides (NZ MfE)					
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	0.04	< 0.01
4.4'-DDD	0.01	mg/kg	0.06	0.04	0.02
4.4'-DDE	0.01	mg/kg	0.10	0.11	0.05
4.4'-DDT	0.01	mg/kg	0.12	0.22	0.06
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	0.03	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01

Client Sample ID			BAL 12C	BAL 16A	BAL 18A
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**Z17-Au21641**	**Z17-Au21651**	**Z17-Au21657**
Date Sampled			**Aug 16, 2017**	**Aug 16, 2017**	**Aug 16, 2017**
Test/Reference	LOR	Unit			
Organochlorine Pesticides (NZ MfE)					
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	104	100	100
Tetrachloro-m-xylene (surr.)	1	%	81	78	78
Heavy Metals					
Arsenic	2	mg/kg	4.7	4.8	< 2
Copper	5	mg/kg	18	36	16
Lead	5	mg/kg	16	18	8.4
% Moisture	1	%	19	19	15

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

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.

Description	Testing Site	Extracted	Holding Time
Organochlorine Pesticides (NZ MfE)	Melbourne	Aug 26, 2017	14 Day
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Heavy Metals	Melbourne	Aug 26, 2017	180 Day
- Method: LTM-MET-3030 by ICP-OES (hydride ICP-OES for Mercury)			
Metals M8 (NZ MfE)	Melbourne	Aug 23, 2017	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
% Moisture	Melbourne	Aug 24, 2017	14 Day
- Method: LTM-GEN-7080 Moisture			

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Site # 23736

Company Name: EC Otago Ltd
Address: PO BOX 5522
Dunedin
New Zealand 9058

Project Name:

Order No.:
Report #: 559143
Phone: 001164 9 3 4728875
Fax:

Received: Aug 17, 2017 4:00 PM
Due: Aug 24, 2017
Priority: 5 Day
Contact Name: Berni Chapman

Eurofins | mgt Analytical Services Manager : Onur Mehmet

Sample Detail						Arsenic	CANCELLED	Copper	HOLD	Lead	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X		X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
External Laboratory													
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**								
1	BAL 1 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21595	X		X		X	X	X	
2	BAL 2	Aug 16, 2017		Soil	Z17-Au21596						X	X	X
3	BAL 3 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21597	X		X		X	X	X	
4	BAL 4 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21598	X		X		X	X	X	
5	BAL 5 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21599	X		X		X	X	X	
6	BAL 6 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21600		X						
7	BAL 7	Aug 16, 2017		Soil	Z17-Au21601						X	X	X

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Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X		X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
8	BAL 8 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21602	X		X		X	X	X	
9	BAL 9	Aug 16, 2017		Soil	Z17-Au21603						X	X	X
10	BAL 10	Aug 16, 2017		Soil	Z17-Au21604						X	X	X
11	BAL 11	Aug 16, 2017		Soil	Z17-Au21605						X	X	X
12	BAL 12 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21606		X						
13	BAL 13 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21607	X		X		X	X	X	
14	BAL 14 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21608	X		X		X	X	X	
15	BAL 15 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21609	X		X		X	X	X	
16	BAL 16 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21610	X		X		X	X	X	

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Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X		X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
17	BAL 17 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21611	X		X		X	X	X	
18	BAL 18 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21612		X						
19	BAL 19 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21613	X		X		X	X	X	
20	BAL 20 COMPOSITE	Aug 16, 2017		Soil	Z17-Au21614	X		X		X	X	X	
21	BAL 21	Aug 16, 2017		Soil	Z17-Au21615						X	X	X
22	BAL 22	Aug 16, 2017		Soil	Z17-Au21616						X	X	X
23	BAL 23	Aug 16, 2017		Soil	Z17-Au21617						X	X	X
24	BAL 24	Aug 16, 2017		Soil	Z17-Au21618						X	X	X
25	BAL 25	Aug 16, 2017		Soil	Z17-Au21619						X	X	X
26	BAL 26	Aug 16, 2017		Soil	Z17-Au21620						X	X	X

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Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X		X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
27	BAL 1A	Aug 16, 2017		Soil	Z17-Au21621				X				
28	BAL 1B	Aug 16, 2017		Soil	Z17-Au21622				X				
29	BAL 1C	Aug 16, 2017		Soil	Z17-Au21623				X				
30	BAL 3A	Aug 16, 2017		Soil	Z17-Au21624				X				
31	BAL 3B	Aug 16, 2017		Soil	Z17-Au21625				X				
32	BAL 3C	Aug 16, 2017		Soil	Z17-Au21626				X				
33	BAL 4A	Aug 16, 2017		Soil	Z17-Au21627				X				
34	BAL 4B	Aug 16, 2017		Soil	Z17-Au21628				X				
35	BAL 4C	Aug 16, 2017		Soil	Z17-Au21629				X				
36	BAL 5A	Aug 16, 2017		Soil	Z17-Au21630				X				
37	BAL 5B	Aug 16, 2017		Soil	Z17-Au21631				X				
38	BAL 5C	Aug 16, 2017		Soil	Z17-Au21632				X				
39	BAL 6A	Aug 16, 2017		Soil	Z17-Au21633		X						

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Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X		X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
40	BAL 6B	Aug 16, 2017		Soil	Z17-Au21634		X						
41	BAL 6C	Aug 16, 2017		Soil	Z17-Au21635		X						
42	BAL 8A	Aug 16, 2017		Soil	Z17-Au21636				X				
43	BAL 8B	Aug 16, 2017		Soil	Z17-Au21637				X				
44	BAL 8C	Aug 16, 2017		Soil	Z17-Au21638				X				
45	BAL 12A	Aug 16, 2017		Soil	Z17-Au21639		X						
46	BAL 12B	Aug 16, 2017		Soil	Z17-Au21640	X		X		X	X	X	
47	BAL 12C	Aug 16, 2017		Soil	Z17-Au21641	X		X		X	X	X	
48	BAL 13A	Aug 16, 2017		Soil	Z17-Au21642				X				
49	BAL 13B	Aug 16, 2017		Soil	Z17-Au21643				X				
50	BAL 13C	Aug 16, 2017		Soil	Z17-Au21644				X				
51	BAL 14A	Aug 16, 2017		Soil	Z17-Au21645				X				
52	BAL 14B	Aug 16, 2017		Soil	Z17-Au21646				X				

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Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X		X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
53	BAL 14C	Aug 16, 2017		Soil	Z17-Au21647				X				
54	BAL 15A	Aug 16, 2017		Soil	Z17-Au21648				X				
55	BAL 15B	Aug 16, 2017		Soil	Z17-Au21649				X				
56	BAL 15C	Aug 16, 2017		Soil	Z17-Au21650				X				
57	BAL 16A	Aug 16, 2017		Soil	Z17-Au21651	X		X		X	X	X	
58	BAL 16B	Aug 16, 2017		Soil	Z17-Au21652				X				
59	BAL 16C	Aug 16, 2017		Soil	Z17-Au21653				X				
60	BAL 17A	Aug 16, 2017		Soil	Z17-Au21654				X				
61	BAL 17B	Aug 16, 2017		Soil	Z17-Au21655				X				
62	BAL 17C	Aug 16, 2017		Soil	Z17-Au21656				X				
63	BAL 18A	Aug 16, 2017		Soil	Z17-Au21657	X		X		X	X	X	
64	BAL 18B	Aug 16, 2017		Soil	Z17-Au21658		X						
65	BAL 18C	Aug 16, 2017		Soil	Z17-Au21659		X						

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Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X		X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
66	BAL 19A	Aug 16, 2017		Soil	Z17-Au21660				X				
67	BAL 19B	Aug 16, 2017		Soil	Z17-Au21661				X				
68	BAL 19C	Aug 16, 2017		Soil	Z17-Au21662				X				
69	BAL 20A	Aug 16, 2017		Soil	Z17-Au21663				X				
70	BAL 20B	Aug 16, 2017		Soil	Z17-Au21664				X				
71	BAL 20C	Aug 16, 2017		Soil	Z17-Au21665				X				
Test Counts						16	9	16	35	16	27	27	11

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Organochlorine Pesticides (NZ MfE)							
2.4'-DDD	mg/kg	< 0.01			0.01	Pass	
2.4'-DDE	mg/kg	< 0.01			0.01	Pass	
2.4'-DDT	mg/kg	< 0.01			0.01	Pass	
4.4'-DDD	mg/kg	< 0.01			0.01	Pass	
4.4'-DDE	mg/kg	< 0.01			0.01	Pass	
4.4'-DDT	mg/kg	< 0.01			0.01	Pass	
a-BHC	mg/kg	< 0.01			0.01	Pass	
Aldrin	mg/kg	< 0.01			0.01	Pass	
b-BHC	mg/kg	< 0.01			0.01	Pass	
Chlordanes - Total	mg/kg	< 0.01			0.01	Pass	
cis-Chlordane	mg/kg	< 0.01			0.01	Pass	
d-BHC	mg/kg	< 0.01			0.01	Pass	
Dieldrin	mg/kg	< 0.01			0.01	Pass	
Endosulfan I	mg/kg	< 0.01			0.01	Pass	
Endosulfan II	mg/kg	< 0.01			0.01	Pass	
Endosulfan sulphate	mg/kg	< 0.01			0.01	Pass	
Endrin	mg/kg	< 0.01			0.01	Pass	
Endrin aldehyde	mg/kg	< 0.01			0.01	Pass	
Endrin ketone	mg/kg	< 0.01			0.01	Pass	
g-BHC (Lindane)	mg/kg	< 0.01			0.01	Pass	
Heptachlor	mg/kg	< 0.01			0.01	Pass	
Heptachlor epoxide	mg/kg	< 0.01			0.01	Pass	
Hexachlorobenzene	mg/kg	< 0.01			0.01	Pass	
Methoxychlor	mg/kg	< 0.01			0.01	Pass	
Toxaphene	mg/kg	< 0.1			0.1	Pass	
trans-Chlordane	mg/kg	< 0.01			0.01	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Method Blank							
Metals M8 (NZ MfE)							
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Organochlorine Pesticides (NZ MfE)							
2.4'-DDD	%	86			70-130	Pass	
2.4'-DDE	%	84			70-130	Pass	
2.4'-DDT	%	85			70-130	Pass	
4.4'-DDD	%	88			70-130	Pass	
4.4'-DDE	%	86			70-130	Pass	
4.4'-DDT	%	81			70-130	Pass	
a-BHC	%	87			70-130	Pass	
Aldrin	%	89			70-130	Pass	
b-BHC	%	83			70-130	Pass	
cis-Chlordane	%	85			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
d-BHC	%	89			70-130	Pass	
Dieldrin	%	86			70-130	Pass	
Endosulfan I	%	86			70-130	Pass	
Endosulfan II	%	87			70-130	Pass	
Endosulfan sulphate	%	86			70-130	Pass	
Endrin	%	72			70-130	Pass	
Endrin aldehyde	%	95			70-130	Pass	
Endrin ketone	%	91			70-130	Pass	
g-BHC (Lindane)	%	95			70-130	Pass	
Heptachlor	%	78			70-130	Pass	
Heptachlor epoxide	%	86			70-130	Pass	
Hexachlorobenzene	%	86			70-130	Pass	
Methoxychlor	%	87			70-130	Pass	
trans-Chlordane	%	84			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	96			80-120	Pass	
Copper	%	104			80-120	Pass	
Lead	%	98			80-120	Pass	
LCS - % Recovery							
Metals M8 (NZ MfE)							
Cadmium	%	97			80-120	Pass	
Chromium	%	101			80-120	Pass	
Mercury	%	104			75-125	Pass	
Nickel	%	104			80-120	Pass	
Zinc	%	101			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Zinc	M17-Au24618	NCP	%	82			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides (NZ MfE)				Result 1					
2.4'-DDD	Z17-Au21599	CP	%	96			70-130	Pass	
2.4'-DDE	Z17-Au21599	CP	%	91			70-130	Pass	
2.4'-DDT	Z17-Au21599	CP	%	87			70-130	Pass	
4.4'-DDD	Z17-Au21599	CP	%	98			70-130	Pass	
4.4'-DDE	Z17-Au21599	CP	%	91			70-130	Pass	
4.4'-DDT	Z17-Au21599	CP	%	94			70-130	Pass	
a-BHC	Z17-Au21599	CP	%	91			70-130	Pass	
Aldrin	Z17-Au21599	CP	%	96			70-130	Pass	
b-BHC	Z17-Au21599	CP	%	84			70-130	Pass	
cis-Chlordane	Z17-Au21599	CP	%	93			70-130	Pass	
d-BHC	Z17-Au21599	CP	%	92			70-130	Pass	
Dieldrin	Z17-Au21599	CP	%	94			70-130	Pass	
Endosulfan I	Z17-Au21599	CP	%	94			70-130	Pass	
Endosulfan II	Z17-Au21599	CP	%	96			70-130	Pass	
Endosulfan sulphate	Z17-Au21599	CP	%	85			70-130	Pass	
Endrin	Z17-Au21599	CP	%	93			70-130	Pass	
Endrin aldehyde	Z17-Au21599	CP	%	84			70-130	Pass	
Endrin ketone	Z17-Au21599	CP	%	90			70-130	Pass	
g-BHC (Lindane)	Z17-Au21599	CP	%	94			70-130	Pass	
Heptachlor	Z17-Au21599	CP	%	93			70-130	Pass	
Heptachlor epoxide	Z17-Au21599	CP	%	92			70-130	Pass	
Hexachlorobenzene	Z17-Au21599	CP	%	90			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Methoxychlor	Z17-Au21599	CP	%	77			70-130	Pass	
trans-Chlordane	Z17-Au21599	CP	%	92			70-130	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Mercury	Z17-Au21605	CP	%	93			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides (NZ MfE)				Result 1					
2.4'-DDD	Z17-Au21609	CP	%	101			70-130	Pass	
2.4'-DDE	Z17-Au21609	CP	%	102			70-130	Pass	
2.4'-DDT	Z17-Au21609	CP	%	97			70-130	Pass	
4.4'-DDD	Z17-Au21609	CP	%	125			70-130	Pass	
a-BHC	Z17-Au21609	CP	%	100			70-130	Pass	
Aldrin	Z17-Au21609	CP	%	105			70-130	Pass	
b-BHC	Z17-Au21609	CP	%	93			70-130	Pass	
cis-Chlordane	Z17-Au21609	CP	%	103			70-130	Pass	
d-BHC	Z17-Au21609	CP	%	101			70-130	Pass	
Dieldrin	Z17-Au21609	CP	%	111			70-130	Pass	
Endosulfan I	Z17-Au21609	CP	%	103			70-130	Pass	
Endosulfan II	Z17-Au21609	CP	%	113			70-130	Pass	
Endosulfan sulphate	Z17-Au21609	CP	%	119			70-130	Pass	
Endrin	Z17-Au21609	CP	%	107			70-130	Pass	
Endrin aldehyde	Z17-Au21609	CP	%	95			70-130	Pass	
Endrin ketone	Z17-Au21609	CP	%	104			70-130	Pass	
g-BHC (Lindane)	Z17-Au21609	CP	%	102			70-130	Pass	
Heptachlor	Z17-Au21609	CP	%	104			70-130	Pass	
Heptachlor epoxide	Z17-Au21609	CP	%	101			70-130	Pass	
Hexachlorobenzene	Z17-Au21609	CP	%	98			70-130	Pass	
Methoxychlor	Z17-Au21609	CP	%	101			70-130	Pass	
trans-Chlordane	Z17-Au21609	CP	%	103			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	Z17-Au21615	CP	%	97			75-125	Pass	
Copper	Z17-Au21615	CP	%	105			75-125	Pass	
Lead	Z17-Au21615	CP	%	76			75-125	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Cadmium	Z17-Au21615	CP	%	100			75-125	Pass	
Chromium	Z17-Au21615	CP	%	95			75-125	Pass	
Nickel	Z17-Au21615	CP	%	92			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides (NZ MfE)				Result 1					
2.4'-DDD	Z17-Au21619	CP	%	113			70-130	Pass	
2.4'-DDE	Z17-Au21619	CP	%	106			70-130	Pass	
2.4'-DDT	Z17-Au21619	CP	%	104			70-130	Pass	
4.4'-DDD	Z17-Au21619	CP	%	122			70-130	Pass	
4.4'-DDE	Z17-Au21619	CP	%	121			70-130	Pass	
4.4'-DDT	Z17-Au21619	CP	%	121			70-130	Pass	
a-BHC	Z17-Au21619	CP	%	108			70-130	Pass	
Aldrin	Z17-Au21619	CP	%	113			70-130	Pass	
b-BHC	Z17-Au21619	CP	%	98			70-130	Pass	
cis-Chlordane	Z17-Au21619	CP	%	109			70-130	Pass	
d-BHC	Z17-Au21619	CP	%	108			70-130	Pass	
Dieldrin	Z17-Au21619	CP	%	113			70-130	Pass	
Endosulfan I	Z17-Au21619	CP	%	111			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan II	Z17-Au21619	CP	%	110			70-130	Pass	
Endosulfan sulphate	Z17-Au21619	CP	%	98			70-130	Pass	
Endrin	Z17-Au21619	CP	%	113			70-130	Pass	
Endrin aldehyde	Z17-Au21619	CP	%	94			70-130	Pass	
Endrin ketone	Z17-Au21619	CP	%	104			70-130	Pass	
g-BHC (Lindane)	Z17-Au21619	CP	%	110			70-130	Pass	
Heptachlor	Z17-Au21619	CP	%	105			70-130	Pass	
Heptachlor epoxide	Z17-Au21619	CP	%	108			70-130	Pass	
Hexachlorobenzene	Z17-Au21619	CP	%	106			70-130	Pass	
Methoxychlor	Z17-Au21619	CP	%	91			70-130	Pass	
trans-Chlordane	Z17-Au21619	CP	%	110			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z17-Au21597	CP	%	17	17	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
4.4'-DDD	Z17-Au21598	CP	mg/kg	0.07	0.07	3.0	30%	Pass	
4.4'-DDE	Z17-Au21598	CP	mg/kg	0.12	0.13	5.0	30%	Pass	
4.4'-DDT	Z17-Au21598	CP	mg/kg	0.13	0.14	1.0	30%	Pass	
a-BHC	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-BHC	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Chlordanes - Total	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
cis-Chlordane	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-BHC	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin ketone	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
g-BHC (Lindane)	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Toxaphene	Z17-Au21598	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
trans-Chlordane	Z17-Au21598	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	Z17-Au21604	CP	mg/kg	8.0	8.1	1.0	30%	Pass	
Copper	Z17-Au21604	CP	mg/kg	24	22	7.0	30%	Pass	
Lead	Z17-Au21604	CP	mg/kg	53	51	3.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Cadmium	Z17-Au21604	CP	mg/kg	0.5	0.5	2.0	30%	Pass	
Chromium	Z17-Au21604	CP	mg/kg	18	17	5.0	30%	Pass	
Mercury	Z17-Au21604	CP	mg/kg	0.2	0.2	3.0	30%	Pass	
Nickel	Z17-Au21604	CP	mg/kg	11	11	3.0	30%	Pass	
Zinc	Z17-Au21604	CP	mg/kg	110	110	4.0	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	Z17-Au21605	CP	mg/kg	6.7	6.4	6.0	30%	Pass	
Copper	Z17-Au21605	CP	mg/kg	20	21	3.0	30%	Pass	
Lead	Z17-Au21605	CP	mg/kg	17	17	1.0	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Cadmium	Z17-Au21605	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z17-Au21605	CP	mg/kg	13	13	1.0	30%	Pass	
Mercury	Z17-Au21605	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	Z17-Au21605	CP	mg/kg	11	11	1.0	30%	Pass	
Zinc	Z17-Au21605	CP	mg/kg	56	52	7.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z17-Au21607	CP	%	24	23	4.0	30%	Pass	
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
2.4'-DDD	Z17-Au21608	CP	mg/kg	0.02	0.02	7.0	30%	Pass	
2.4'-DDE	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDT	Z17-Au21608	CP	mg/kg	0.04	0.04	1.0	30%	Pass	
4.4'-DDD	Z17-Au21608	CP	mg/kg	0.08	0.08	2.0	30%	Pass	
4.4'-DDE	Z17-Au21608	CP	mg/kg	0.23	0.23	<1	30%	Pass	
4.4'-DDT	Z17-Au21608	CP	mg/kg	0.34	0.35	4.0	30%	Pass	
a-BHC	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-BHC	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Chlordanes - Total	Z17-Au21608	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
cis-Chlordane	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-BHC	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin ketone	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
g-BHC (Lindane)	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Toxaphene	Z17-Au21608	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
trans-Chlordane	Z17-Au21608	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	Z17-Au21615	CP	mg/kg	8.6	8.6	<1	30%	Pass	
Copper	Z17-Au21615	CP	mg/kg	21	21	1.0	30%	Pass	
Lead	Z17-Au21615	CP	mg/kg	34	34	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Cadmium	Z17-Au21615	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	Z17-Au21615	CP	mg/kg	15	14	1.0	30%	Pass	
Nickel	Z17-Au21615	CP	mg/kg	12	12	1.0	30%	Pass	
Zinc	Z17-Au21615	CP	mg/kg	190	180	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	Z17-Au21617	CP	%	20	21	4.0	30%	Pass	

Comments

Re-created report with amended results

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Onur Mehmet	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.