

19-D-02771

s 9(2)(a)

Reporter

s 9(2)(a) @stuff.co.nz

Dear s 9(2)(a)

Thank you for your emails of 20 December 2019 and 22 January 2020 (clarification) requesting the following under the Official Information Act 1982 (the Act):

Can I please request that briefing plus any other documents on the same topic [Christchurch landfill] under the OIA?

As far as the OIA request goes, documents relating to just the Christchurch landfill would be great thanks.

The Ministry for the Environment has identified 42 documents in scope of your request, and released 33 as listed in the attached document schedule.

Nine documents have been withheld in full, and some information within the released documents has been redacted, under the following sections of the Act:

- 9(2)(a) to protect the privacy of natural persons including that of deceased natural persons.
- 9(2)(b)(ii) to protect information where the making available of the information would be likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information.
- 9(2)(g)(i) to maintain the effective conduct of public affairs through the free and frank expression of opinions.

In terms of section 9(2) of the Act, I am satisfied that, in the circumstances, the withholding of this information is not outweighed by other considerations that render it desirable to make the information available in the public interest.

You have the right to seek an investigation and review by the Office of the Ombudsman of my decision to withhold information relating to this request, in accordance with section 28(3) of the Act. The relevant details can be found on their website at: www.ombudsman.parliament.nz.

Please note that due to the public interest in our work the Ministry for the Environment publishes responses to requests for official information on our [OIA responses page](#) shortly after the response has been sent. If you have any queries about this, please feel free to contact our Executive Relations team: ministerials@mfe.govt.nz.

Yours sincerely



Glenn Wigley
Director – Natural & Built System

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the Official Information Act 1982

Document schedule

Document No.	Document Date	Content	Decisions	OIA sections applied
D01	02/10/2018	CSRF Application Form Part 1 (1)	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D02	18/09/2015	DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D03	02/08/2017	ECan Phase 2 PMP final draft	Released in part	S9(2)(a) – to protect privacy of landowners
D04		CSRF Application Form (Part 1)	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D05	19/07/2019	Letter to ECan CEO re Contaminated Sites	Released in part	S9(2)(a) – to protect privacy of landowners
D06	23/12/1998	LIM Hazard Letter.pdf	Released in part	S9(2)(a) – to protect privacy of landowners
D07	29/07/2013	DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D08	2018	CSRF Application Form (Part 1)	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D09	03/11/2014	DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D10	02/09/2016	SVI Report	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D11	10/05/2015	DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D12	12/11/2015	DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D13	24/09/2015	DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D14	26/02/2016	Additional DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D15	05/04/2016	Further DSI Report	Released in part	S9(2)(a) – to protect privacy of landowners
D16	02/06/2017	Funding Approval Letter Signed	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D17	07/09/2018	CDHB Remediation Fund Support Letter	Released in part	S9(2)(a) – to protect privacy of landowners
D18	21/03/2017	Christchurch City Council Funding Confirmation Memo	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(iii) – to protect commercially sensitive information
D19	27/09/2018	Contaminated Site Remediation Fund Letter	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(iii) – to protect commercially sensitive information

Document No.	Document Date	Content	Decisions	OIA sections applied
D20	15/08/2019	CSRF Funding Support Letter	Released in part	S9(2)(a) – to protect privacy of landowners
D21	16/04/2019	ECAN Letter CSRF Invitation to Stage 2	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D22	20/11/2017	ECan Signed CSRF Deed	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D23	16/12/2019	ECan CSRF Refunding Response	Released in part	S9(2)(a) – to protect privacy of landowners
D24	21/03/2017	Environment Canterbury Funding Confirmation Memop	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D25	31/03/2017	Environment Canterbury Application	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D26	28/03/2017	Environment Canterbury Scoping Study Result Tables and Maps	Released in part	S9(2)(a) – to protect privacy of landowners
D27	12/12/2017	FM-HSE-006 Landfill	Released in part	S9(2)(a) – to protect privacy of landowners
D28	01/03/2018	GHD Report DSI Final	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D29	24/11/2017	Phase 2 Deed Signing Memo	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D30	02/06/2017	CSRF Application Approval Letter	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D31	30/08/2019	Request to MfE for 100% funding	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information
D32	12/12/2017	Sampling Plan	Released in part	S9(2)(a) – to protect privacy of landowners
D33	18/11/2019	Review of CSRF Funding – Historical Christchurch Landfill	Released in part	S9(2)(a) – to protect privacy of landowners S9(2)(b)(ii) – to protect commercially sensitive information

					S9(2)(g)(i) – to maintain the effective conduct of public affairs
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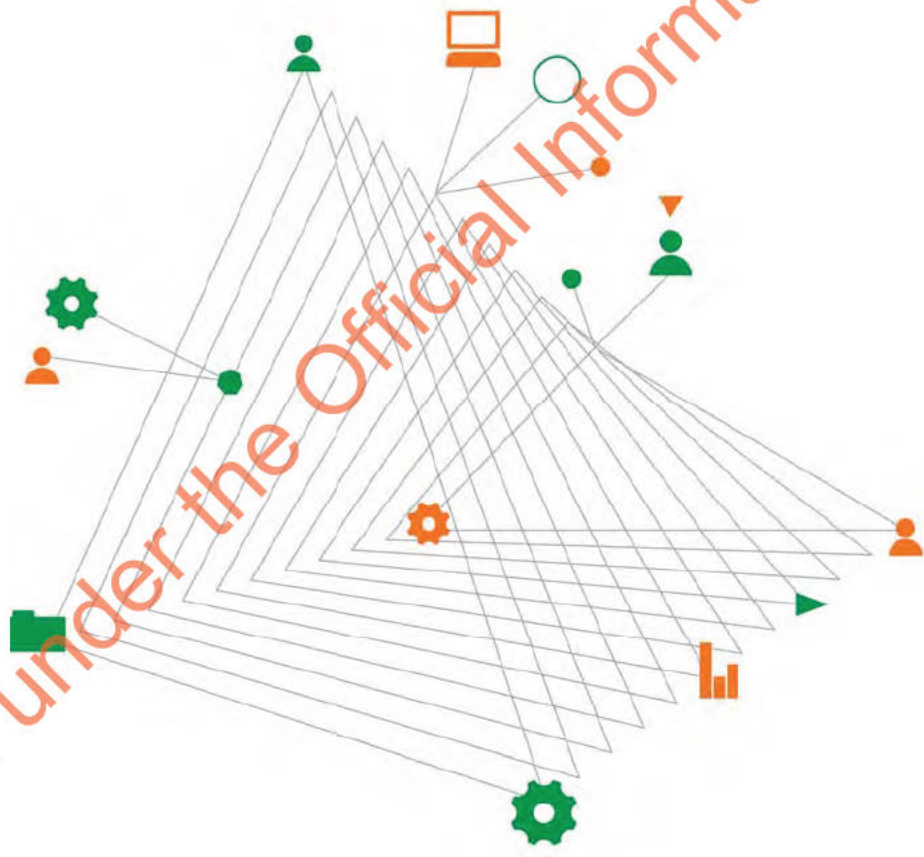
Tower Insurance Limited C\ - Stream Group New Zealand Ltd

Detailed Site Investigation

s 9(2)(a) [redacted], Christchurch

10 May 2015

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comes to life
when it is
powered by
expertise

Executive Summary

Site Address	s 9(2)(a) Christchurch
Legal Description	s 9(2)(a)
HAIL Activities	G5 – Waste disposal to land
Analytes Tested	Heavy metals and polycyclic aromatic hydrocarbons (PAHs)
Analytes above background	Arsenic, cadmium, chromium, nickel, zinc, lead, copper and mercury and all analysed polycyclic aromatic hydrocarbon compounds (PAHs).
Analytes above the selected criteria for human health	Arsenic, cadmium, chromium, nickel, lead and copper and the Benzo(a)pyrene equivalent value.
NES Permitted Activity threshold volumes for:	
1. Soil disturbance	50 cubic metres
2. Soil taken away per year	6.1 cubic metres
Findings	<ul style="list-style-type: none"> All heavy metals and PAH compounds were reported at concentrations above the adopted background values in the four soil samples collected and analysed. Soil sample A (1.0-1.2) and soil sample B (0.4-0.5) had reported concentrations of arsenic, lead and the benzo(a)pyrene equivalent above the residential NES SCSs. Soil sample A (1.4-1.8) had reported concentrations of arsenic, cadmium, chromium, copper, lead, nickel and the benzo(a)pyrene equivalent above the residential NES SCSs. Soil sample D had reported concentrations of lead and the benzo(a)pyrene equivalent above the residential NES SCSs. All of the tested heavy metals (except for arsenic) and ten PAH compounds were reported in excess of the ANZECC ISQC (High) guideline values.
If the permitted activity volumes ARE NOT exceeded	<ul style="list-style-type: none"> No further consenting work is required; however, additional management actions or investigation works may be required due to detection of 6 heavy metals and one PAH compound above the human health criterion at the site. Refer to Section 8 of this report for further details. A copy of this report should be forwarded to ECan to comply with the Natural Resources Regional Plan (NRRP) permitted activity rule WQL 46.
If the permitted activity volumes ARE exceeded	<ul style="list-style-type: none"> Application for a restricted discretionary activity consent (under regulation 10 of NES) for the earthworks associated with the rebuild of the existing dwelling. Coffey would be pleased to assist with this. Confirm with ECan and CCC if stormwater consent is required during the earthworks phase of works at the site. Coffey would be pleased to assist with this. Additional management actions are recommended for continued use of the property as a residence. Refer to Section 8 of this report for additional management actions required. A copy of this report should be forwarded to ECan to comply with the Natural Resources Regional Plan (NRRP) permitted activity rule WQL 46. A copy of this report should be submitted to CCC as part of any building or land use consent application to explain the contaminated land status of this property.

The findings of this report should be read together with "Important Information About Your Coffey Environmental Report" attached to this report.



131 Wrights Road
Addington, Christchurch
PO Box 1872
Christchurch 8140 New Zealand
t: +64 3 374 9600
f: +64 3 374 9601
coffey.com

10 May 2015

Tower Insurance Ltd C/ Stream Group New Zealand

Attention: Nathan Tahi

Dear Nathan

Stream Claim Number: C30446
Coffey Project No: ENNZCHRI52154AA

RE: Detailed Site Investigation at § 9(2)(a) [redacted], **Christchurch**

Please find attached our report presenting the findings of a Detailed Site Investigation carried out to support the proposed foundation relevel and replacement of the pathways and driveway at § [redacted] Christchurch. This assessment was conducted in accordance with our proposal, dated 17 April 2014. 2)

If you have any queries or you require further clarification on any aspects of this report, please contact the undersigned.

For and on behalf of Coffey

A handwritten signature in black ink that reads "Cecilia Gately".

Cecilia Gately
Environmental Consultant

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Detailed Site Investigation

Prepared for
Tower Insurance New Zealand Ltd

Prepared by
Coffey Geotechnics (NZ) Ltd
131 Wrights Road, Addington
Christchurch 8024 New Zealand
t: 03 374 9600 f: 03 374 9601
IRD: 096022417

Project Director	Warren Sharp Associate GeoEnvironmental Consultant
Project Manager	Cecilia Gately Environmental Scientist
Prepared By	Nicole Morgan Geo Environmental Consultant

10 May 2015

ENNZCHRI52154AA

Quality information

Revision history

Revision	Description	Date	Author	Reviewer
V1 Final	Final	10/05/2015	N.M	A.H.

Distribution

Report Status	No. of copies	Format	Distributed to	Date
V1 Final	1	PDF	Tower Insurance New Zealand Ltd C/- Stream Group New Zealand Ltd. – Mr s 9(2)(a)	10/05/2015

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- Appendix A – Environment Canterbury LLUR Statement
- Appendix B - Historical Aerial Photographs
- Appendix C – Field Forms and Borehole Logs
- Appendix D – Site Photographs
- Appendix E – Laboratory Results

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Abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
Bgl	below ground level
CCC	Christchurch City Council
COC	Chain of Custody
DSI	Detailed Site Investigation
ECan	Environment Canterbury
HAIL	Hazardous Activities and Industries List
IANZ	International Accreditation New Zealand
LOR	Limit of Reporting
LLUR	Listed Land Use Register
mg/kg	milligrams per kilogram
MfE	Ministry for the Environment
NES	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NRRP	Natural Resources Regional Plan
PAH	Polycyclic aromatic hydrocarbon
PID	Photoionisation Detector
QA	Quality Assurance
QC	Quality Control
SCS	Soil Contaminant Standard (as referenced in the NES)
SQEP	Suitably Qualified and Experienced Practitioner
VOC	Volatile Organic Compound

1. Introduction

Coffey Geotechnics (NZ) Limited (Coffey) was commissioned by Stream Group NZ Limited (Stream), acting on behalf of TOWER Insurance Limited (TOWER) to conduct a Detailed Site Investigation (DSI) at s 9(2)(a), Christchurch (the site). This investigation was conducted in order to assess the consent requirements under the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (NES) associated with soil disturbance work required to relevel the foundation and replace the pathways and driveway at the site. This investigation also included a high-level assessment of potential disposal options for any excess spoil generated during the site works. This assessment was prepared in accordance with our proposal, dated 17 April 2014.

A site location plan is provided as Figure 1.



Figure 1 - Site location plan

1.1. Background

This site is not listed on the Environment Canterbury (ECan) Listed Land Use Register (LLUR) as having had an activity defined on the hazardous activities or industries list (HAIL) occurring at the property (Appendix A). However, the engineering consultancy company 'Geoscience' carried out an environmental soil investigation on the adjacent property at s 9(2)(a) and encountered fill soils to a depth of 2.0 m below ground level (bgl) which contained brick fragments, shells, glass, concrete, metal, charcoal and wood (ENGEO 2014).

The site is also located within an area, bounded by s 9(2)(a) that is shown on the Christchurch City Council (CCC) historic landfills map to have shallow fill present (CCC Landfill Map 1995). During the environmental investigation, fill material was encountered to a depth of 2.0 m bgl, where the hand auger was terminated due to refusal. Brick, plastic, ceramic, charcoal, metal and burned rubbish were all observed in the fill during sampling.

Due to the identification of fill material on the site, a G5 (Waste disposal to land) classification as defined in the Ministry for the Environment (MfE's) HAIL (MfE 2011a) has been adopted for this site.

Due to historical landfilling activities on the site, the NES regulations apply, and an environmental investigation of the soil at the site is required as part of the construction works being carried out.

1.2. Objectives

The objectives of this DSI were to assess the need for NES consent during the construction works at the site, and to characterise material that potentially requires off-site disposal. These objectives were achieved by investigating the presence and extent of contamination within the soil material that may be disturbed and/or removed from site during the re-levelling and repaving works.

1.3. Scope of works

The scope of works performed by Coffey Suitably Qualified and Experienced Practitioners (SQEPs) was:

- Notify Environment Canterbury (ECan) of contaminated site investigations as required by Rule WQL 46 of the ECan Natural Resources Regional Plan (NRRP).
- Review of available information from ECan and Christchurch City Council (CCC), in particular review of the available property files and relevant resource consents.
- Attendance at site to conduct a walkover and for the collection of five soil samples from four hand auger locations. Sample depths and locations were selected to provide coverage of soils that may be disturbed during the re-levelling works.
- Field screening of each soil sample for ionisable volatile organic compounds (VOCs) using a Photoionisation Detector (PID).
- Analysis of samples at an accredited laboratory for polycyclic aromatic hydrocarbons (PAHs) and heavy metals.
- Preparation of this report, including presentation and interpretation of results in accordance with the requirements of the NES.

2. Site information

2.1. Site identification

The site is situated approximately s 9(2)(a) of Christchurch city centre in the suburb of s 9(2)(a). s 9(2)(a) is 665 m long and connects onto s 9(2)(a) to the north. Site details are presented in Table 1.

Table 1 - Site identification

Site Address	s 9(2)(a) Christchurch
Legal Description	s 9(2)(a)
Site area	~ 607 m ²
NES Permitted activity threshold volumes for:	
1. Soil disturbance per year ¹	50 m ³
2. Soil removal ² per year	6.1 m ³
Territorial Authority	Christchurch City Council
Current Site Use	Residential
Proposed Site Use	Residential
Adjoining Site Uses	South Residential North s 9(2)(a) and Residential East s 9(2)(a) and Residential West Residential
Surface Water Bodies	The nearest body of water is the Heathcote River – the closest embankment is located approximately s 9(2)(a). The site is located s 9(2)(a)
Topography	The site is on generally flat lying ground.

2.2. Site history

During Coffey's environmental investigation of the site in April 2015, evidence of fill material was encountered to a refusal depth of 2.0 m below ground level (bgl). The fill contained ceramic pieces, metal scraps, charcoal fragments, burned rubbish and brick fragments.

This site is also located within an area shown on the CCC historic landfills map as having shallow fill present.

¹ Following communications with CCC (I. Stout, email 29/04/2014), the volume of allowable soils to be disturbed has been calculated as 25m³ for every 500m² of site area.

² Following communications with CCC (I. Stout, email 29/04/2014), the volume of allowable soils to be removed from the site has been calculated based on a pro-rata assessment with respect to the area of site (5m³ for every 500m² of the site area).

ECan holds a collection of publically available historical aerial photographs for the greater Christchurch area. These were inspected with the objective of assessing evidence for any past HAIL activity at or around the site.

The earliest aerial photograph Coffey was able to obtain is dated 1941. The site appears to be part of the front lawn of a larger residential section. The site layout is unchanged in the 1946 aerial photograph. The 1955 aerial photograph shows that the larger residential section has been subdivided and that a residential dwelling and shed have been built on the site. There is no change in the 1965 aerial photograph. In the 1973 aerial photograph an additional small building appears on the southwest of the site. The 1984 and 2011 photographs show the site and surrounding area is unchanged. The 1994 aerial photograph is of poor quality and little can be inferred from its examination. No visual evidence of landfilling can be seen in the historical aerial photographs which are included in Appendix B.

2.3. Geology and hydrogeology

The geological map of the area (Brown and Weeber, 1992) indicates that the site has surface geology consisting of "Dominantly alluvial *sand and silt overbank deposits*" of the Springston Formation.

During the environmental investigation, discussed herein, fill soils were encountered at the site to a refusal depth of 2.0 m bgl. The environmental soil descriptions are included in Appendix C.

Groundwater levels presented in the Canterbury Geotechnical Database "GNS Science Median Groundwater Surface Elevations" Map Layer for Google Earth, issued in May 2014 show groundwater depths of between 3 - 4 m bgl in the vicinity of the site (GNS 2014).

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3. Site characterisation

3.1. HAIL activities and contaminants of potential concern

During the environmental investigation completed on the 15 April 2015, landfill material was encountered at all sample locations on the site. The presence of this material indicates that the site has been used for landfilling activities in the past and so can be given a HAIL G5 classification. No information relating to this HAIL activity on the site was available on CCC Webmap.

Contaminants of potential concern for this site based on the identified landfill HAIL activity include heavy metals (including mercury) and polycyclic aromatic hydrocarbons (PAHs).

3.2. Statutory provisions

3.2.1. NES

If the proposed construction works are to proceed as indicated, the NES regulations potentially apply because:

- The site may have accommodated a HAIL activity (G5 – waste disposal to land).
- The volume of soil disturbed and/or removed may exceed the maximum allowable for permitted activity status (shown in Table 1).

Note that the disturbance of soil for this investigation is an activity described in Regulation 8 of the NES. The activity was permitted as the soil sampling complied with the conditions associated with this regulation.

3.2.2. Natural Resources Regional Plan (NRRP)

Rule WQL6 of the NRRP relates to the discharge of stormwater onto or into land. The discharge of stormwater onto or into contaminated land is theoretically not a permitted activity under this rule.

Mr Gregory Beck, Principal Contaminated Sites Advisor at ECan was requested to clarify the requirement for consent and his comments were (ECan 2014):

"If soil concentrations are less than ANZECC ISQG-High sediment quality criteria or the volume of soil disturbance is less than 25 m³, then stormwater discharge associated with construction phase earthworks works fall under the CCC Interim Global consent, and do not require application for separate stormwater discharge consent. Sites with soil concentrations in excess of ISQG-High criteria will be assessed by ECan on a site specific basis, with sites classified by ECan as medium or high risk requiring consent application for the construction works, and possibly also requiring an on-going 'operational' consent application following completion of the construction works."

3.3. Soil sampling

The sampling programme was developed to characterise the soil at the site. Sample depths and locations were selected to provide adequate coverage of soils that may be disturbed during the construction works. The soil type at each sample location was recorded in general accordance with standard Coffey procedures (based on the New Zealand Geotechnical Society Field Description of Soil and Rock, NZGS 2005).

The proposed depth of soil disturbance required for the foundation re-levelling has not yet been determined. Should excavation of soil be required below 2.0 m, further testing may be required.

Soil samples were collected from four locations at the site on 15 April 2015. The hand auger locations were designated HA:A through to HA:D, as shown on Figure 2.



Figure 2: Site layout with hand auger locations (HA:A to HA:D).

All soil samples were collected from fill soils comprising silt and silty sand. Glass, gravel, ceramic pieces, charcoal fragments and gypsum were observed in the soil at the shallow soil sample location from hand auger HA:A (1.0-1.2m), at the soil sample location from hand auger HA:B (0.4-0.5m) and at the soil sample location from hand auger HA:C (0.5-0.6m). Soil at the sample locations HA:A (1.4-1.8m) and HA:D (from hand auger HA:B) contained mainly silty sand fill.

Field notes and soil descriptions can be found in Appendix C. Photographs of the site and sample locations taken during the field work are presented in Appendix D.

At the time of the environmental investigation, the residential dwelling and all paved areas were still in place at the site, limiting access to soil that may be disturbed during the construction works. Soil samples were therefore collected from as close to the dwelling and paved areas as possible.

3.4. Soil sampling procedure

The following procedures were adopted during investigation works:

- All fieldwork was carried out in compliance with a project specific Health, Safety, Security and Environment (HSSE) Plan prepared for the site works.

- All works were conducted by trained Coffey staff with precautions taken including implementation of procedures for the appropriate handling of potentially contaminated material.
- Prior to sampling, and between sample locations, sampling equipment was cleaned by washing with deionised water, followed by a decontamination solution, and rinsing with deionised water.
- Soils encountered during sampling were observed for the presence of visual and olfactory evidence of contamination.
- Soil samples were collected using a clean pair of nitrile gloves for each sample and then placed into laboratory supplied sample containers.
- Each soil sample was screened for the presence of ionisable VOCs using a portable PID. This was undertaken by placing a portion of sample into a zip lock plastic bag and allowing time for it to volatilise into the headspace of the bag. Measurement of ionisable VOCs was then conducted by placing the PID intake into the top of the sample bag. The readings were monitored for approximately one minute and the maximum concentration recorded.
- Following collection, all samples were placed directly into chilled storage and transported, under standard Coffey chain of custody procedures, to RJ Hill Laboratories of Hamilton (Hill Laboratories). Sample A (1.0-1.2m), sample A (1.4-1.8m), sample B (0.4-0.5) and sample D (0.1-0.2m) were submitted for analysis.
- At each sample location, any remaining soil that was not collected into sample jars was placed back into the sampling location.

3.5. Laboratory analysis

Following receipt and registration of the samples at Hill Laboratories, soil samples A (1.0-1.2), A (1.4-1.8), B (0.4-0.5) and D (0.1-0.2) were analysed for heavy metals, including arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc; and PAHs.

Soil sample C was not tested and it was placed on hold in case further testing was required.

4. Quality assurance/quality control

The quality assurance/quality control procedures employed during Coffey's intrusive investigation works are summarised below.

- SQEP – All fieldwork has been managed by a Suitably Qualified and Experienced Practitioner (SQEP) and the report was reviewed by a SQEP, as required by the NES.
- Use of Accredited Laboratory – Hill Laboratories is accredited by international accreditation New Zealand (IANZ) for the analyses performed. As such, the laboratory is expected to comply with the accreditation requirements, which include the confirmation of validity and suitability of results. Any such breaches in laboratory quality control would be notified at the time of release of the analytical results. There were no analyst's notes included in the laboratory reports.
- Sample Handling and Holding Times – The chain of custody records show that the samples were submitted to Hill Laboratories on 16 April 2015 and registered by the lab on the 17 April 2015. Analysis was completed and reported on 24 April 2015. This is within the accepted holding times for the analyses requested.
- Quality Control samples – Due to the small scale of the site investigation, no duplicate samples were collected and analysed. This approach has been discussed with and approved by CCC.

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5. Applicable soil contaminant standards

5.1. Background concentrations

Under Regulation 5(9) of the NES, where a DSI exists that demonstrates that contaminants in or on the piece of land are at, or below, background concentrations, then the NES Regulations do not apply. This site is located within the Canterbury soil group defined as urban recent. However, natural soils were not encountered at the site during this investigation.

This site is located in an area known to have been landfilled. The origin of the fill is unknown and as such the highest background values from the variety of urban Christchurch soils have been adopted for this site. Accordingly background concentrations for this soil type have been adopted from:

- Background Concentrations of Selected Trace Elements in Canterbury Soils. Addendum 1: Additional Samples and Timaru Specific Background Levels. Report R07/1/2 (ECan 2007a).
- Background Concentrations of polycyclic aromatic hydrocarbons in Christchurch urban soils Report R07/19 (ECan 2007b).

Adopted background criteria are presented in Table 2.

5.2. Priority contaminants: Soil contaminant standards

The User's Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (MfE 2012) details Soil Contaminant Standards (SCSs) for seven inorganic substances and five organic compounds (or groups of compounds). SCSs are available for these substances and compounds when present in land used for five land use scenarios. The contaminants analysed at this site for which SCSs are available are arsenic, cadmium, chromium, copper, lead, mercury and the benzo(a)pyrene equivalent (BaP). For this site, a residential land-use exposure scenario was adopted, which includes the following source/pathway/receptor assumptions:

- Potential receptors include site workers during the construction works, and residential occupants of the property.
- The selected residential SCSs assume 10% of produce consumed will be grown on-site.
- It has been assumed that the soil pH is 5, and that all lead is present in inorganic form.

For most contaminants, standards for short-term site worker exposure are not available in New Zealand or international guidance documents referenced by the NES. As such, standards for residential land use have conservatively been used to assess risks to both site workers and end users of the site. NES SCSs adopted for the site are presented in Table 2.

5.3. Other applicable human health standards

For contaminants of concern that are not priority contaminants, the NES references the hierarchy defined in the Contaminated Land Management Guideline No.2 (MfE, 2011b).

For the two heavy metals detected at the site for which SCSs are not available, nickel and zinc, the Australian National Environment Protection Measure (NEPM) (NEPC 2013) concentrations have been adopted for screening assessment purposes.

For several PAHs, the MfE Guidelines for Assessing and Managing Contaminated Gasworks sites in New Zealand – Module 4 Soil Acceptance Criteria, have been selected (MfE 1997). Health risk based acceptance criteria for standard residential site use (10% of produce consumed is home-grown) have been selected.

For naphthalene and pyrene, Tier 1 screening criteria from the MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011) have been

selected. Tier 1 soil acceptance criteria for TPH, Residential use, All Pathways, sandy silt, <1.0 m depth have been used (MfE 2011).

5.4. Soil disposal criteria

In addition to assessing the human health and discharge risks associated with soil disturbance and end use of the site, an assessment of off-site disposal options for any excess soil generated during site works has been conducted. Dependent on contamination concentrations the off-site spoil disposal options range in cost, from low to high, from disposal to cleanfill sites through managed fill sites to licensed hazardous waste landfills. Disposal to a cleanfill site represents the most cost effective off-site disposal option. MfE (2002) defines cleanfill material as:

Material that when buried will have no adverse effect on people or the environment. Cleanfill material includes virgin natural materials such as clay, soil and rock, and other inert materials such as concrete or brick that are free of:

- *Combustible, putrescible, degradable or leachable components.*
- *Hazardous substances.*
- *Products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices.*
- *Materials that may present a risk to human or animal health such as medical and veterinary waste, asbestos or radioactive substances.*
- *Liquid waste.*

The requirement for the material to be free of hazardous substances effectively requires that the concentrations of compounds be below background concentrations for the local or regional environment. For compounds without established background levels, the concentrations should be below the level of analytical detection. For disposal to a cleanfill, soil sample results can therefore be assessed against the background criteria adopted in Section 5.1.

For comparative purposes only, acceptance criteria for Burwood Landfill have also been included in Table 2. Coffey understand that Burwood Landfill use the recreational SCS criteria as an initial screening tool for soil/spoil acceptance at the landfill (Personal communication 12 November 2014, David Harris, Christchurch City Council).

5.5. Stormwater Consent Evaluation

To evaluate the potential for rebuild-associated soil disturbance to require an ECan stormwater discharge consent soil analytical results can be compared to ISQG-High Sediment quality criteria from the Australian and New Zealand Environment and Conservation Council (ANZECC) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000). Relevant guideline criteria for this evaluation are included in Table 2.

6. Results

Field screening of the soil samples using the PID did not detect any ionisable VOCs (i.e. all readings at 0.0 ppmv). No olfactory evidence of contamination was observed in the field (refer to the field notes and logs in Appendix C). Soil analytical results are summarized in Table 2, and the laboratory analytical reports are included in Appendix E.

- All heavy metals and PAH compounds were reported at concentrations above the adopted background values in the four soil samples collected and analysed.
- Soil sample A (1.0-1.2) and soil sample B (0.4-0.5) had reported concentrations of arsenic, lead and the BaP equivalent above the residential NES SCSs.
- Soil sample A (1.4-1.8) had reported concentrations of arsenic, cadmium, chromium, copper, lead, nickel and the BaP equivalent above the residential NES SCSs.
- Soil sample D had reported concentrations of lead and the BaP equivalent above the residential NES SCSs.
- All of the tested heavy metals (except for arsenic) and ten PAH compounds were reported in excess of the ANZECC ISQC (High) guideline values.

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7. Conclusions

The site is on land that has been subjected to historical landfilling (HAIL activity G5). Though it is not listed on the LLUR, it is thought likely that shallow landfilling that occurred in the past nearby, extends beyond previously defined boundaries onto the site.

Coffey considers that the NES Regulations do apply to this site. Reported concentrations of all analysed heavy metals and PAH compounds exceed the adopted background values in the soil at all of the sampling locations. In addition, arsenic, chromium, cadmium, copper, lead, nickel and the BaP equivalent value were reported at concentrations above the selected human health (NES SCS residential) criteria. Therefore, a consent application for a restricted discretionary activity should be submitted to CCC for the site works if soil disturbance and/or removal volumes are greater than those stated in Table 1 of this report.

Based on laboratory analytical results, it is likely that stormwater consent will be required for the construction works due to of the various heavy metals and PAH compounds reported at concentrations above the ANZECC ISQG-High guideline values. ECan should be consulted to determine whether stormwater consent is required.

The results of this DSI also indicate that surplus soil generated during the repaving and foundation re-leveling works at this site are not suitable for disposal at a cleanfill site or Burwood Landfill, as copper, lead, nickel and the BaP equivalent value were present in soils at concentrations above Burwood landfill's waste acceptance criteria. The soil may be suitable for disposal at Kate Valley Landfill but it is likely that further analysis of surplus soil will be required prior to its acceptance by the landfill. The data discussed herein should be provided to the landfill facility for confirmation prior to disposal.

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8. Recommendations

This Coffey DSI provides a framework for managing contamination at the site by identifying potential hazards and suggesting mitigation measures relevant to known site conditions. This DSI is not intended to relieve the Contractor or the controller of the place of work of their responsibility for the health and safety of their workers and contractors under the Health and Safety in Employment Act 1992 and Health and Safety in Employment Amendment Act 2002.

Based on the results of this investigation and permitted activity volumes in Table 1, Coffey recommends the following.

If the Permitted Activity Volumes ARE NOT Exceeded

Based on the results of this investigation, should the permitted activity volumes of soil disturbance / removal **not be exceeded** then no further consenting work is required; however:

- Due to the detection of six heavy metals and the BaP equivalent value being reported at concentrations above the NES residential criterion for protection of human health, site remediation and/or additional investigation and assessment of site-specific risks may be required. We note that this is beyond the scope of this investigation. Coffey would be pleased to assist with further investigations, if required. We would recommend that actions be taken to manage this matter prior to soil disturbance works occurring on the site.
- If any additional visual or olfactory evidence of contamination is encountered during soil disturbance activities at the site, a SQEP should be consulted. Coffey would be pleased to assist with this.
- A copy of this report should be supplied to ECan to meet the permitted activity requirements of the Natural Resources Regional Plan Rule WQL46 and Proposed Canterbury Land and Water Regional Plan Rule 5.168.

During site works:

- Management of disturbed soil by off-site disposal at a suitably authorised facility. Soil material at site contains heavy metals and PAH compounds above the adopted background values and Burwood Landfill's waste acceptance criteria. Subject to further analytical testing, surplus soil may be suitable for disposal at Kate Valley Landfill. Off-site disposal of any surplus soil at the site is subject to acceptance by the receiving facility.
- Implementation of standard construction controls, including appropriate hygiene facilities and personal protective equipment (PPE) (steel toe cap boots, long sleeve clothing, and work gloves), to mitigate the risks to human health during the soil disturbance works.
- Implementation of standard construction practices for minimising erosion and sediment migration to mitigate the risks to the wider environment during the soil disturbance works.
- The requirements in regulation 8(3) of the NES must be met including: disturbed soil must be reinstated to an erosion-resistant state within one month of completing the site works and the duration of the activity must be no longer than two months.

If the Permitted Activity Volumes ARE Exceeded

Should the permitted activity volumes of soil disturbance/removal **be exceeded**, Coffey recommends the following occur:

- Complete CCC's Form 9, including an assessment of effects for restricted discretionary activity consent (under regulation 10 of the NES) for the earthworks associated with the site works at the property.
- A copy of this DSI report should also be submitted as part of the NES consent application to explain the contaminated land status of this property.

- To support the consent application, preparation of a plan outlining the approach to manage human health and environment risks during the proposed earthworks. Coffey would be pleased to assist with this. In particular this plan would detail the management proposed for the elevated heavy metals and PAH compound concentrations at the site.
- Confirm with ECan and CCC if stormwater consent is required during the earthworks phase of works at the site. If required, prepare and submit an application for stormwater discharge consent from ECan as a restricted discretionary activity during the construction phase (due to six heavy metals and one PAH compound exceeding the ANZECC guideline values). Coffey would be pleased to assist with this.
- A copy of this DSI report should be supplied to ECan to meet the permitted activity requirements of the Natural Resources Regional Plan Rule WQL46 and Proposed Canterbury Land and Water Regional Plan Rule 5.168 (ECan 2011).

During site works:

- Management of disturbed soil by off-site disposal at a suitably authorised facility. Soil material at site contains heavy metals and PAH compounds above the adopted background values and Burwood Landfill's waste acceptance criteria. Subject to further analytical testing, surplus soil may be suitable for disposal at Kate Valley Landfill. Off-site disposal of any surplus soil at the site is subject to acceptance by the receiving facility.
- Evidence of soil disposal to an authorised facility should be submitted to the Environmental Compliance Section of CCC by way of waste manifest and/or weighbridge receipts within two months of the excavation. The purpose of this measure is to confirm that any surplus soils were disposed of appropriately.
- Implementation of standard construction controls, including appropriate hygiene facilities and PPE (steel toe cap boots, long sleeve clothing, and work gloves), to mitigate the risks to human health during the soil disturbance works.
- Implementation of standard construction practices for minimising erosion and sediment migration to mitigate the risks to the wider environment during the soil disturbance works.

9. Limitations

The findings of this report should be read together with “Important Information About Your Coffey Environmental Report” attached to this report.

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10. References

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Limitations

Important information about your Coffey Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but

steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such

assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

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Tables

Table 2: Summary of Soil Analytical Results
Site Name S 9(2)(a) Christchurch

Analyte	NES SCSs ¹ for Protection of Human Health based on a Residential Land-use (10% homegrown produce consumed) (mg/kg)	Environment Canterbury's Background Concentrations for Fill Soils ⁷ (mg/kg)	ANZECC ISQG-High ⁸ (mg/kg)	Burwood Landfill Acceptance Criteria ⁹ (example only) (mg/kg)	Sample A	Sample A	Sample B	Sample D
					15-Apr-15	15-Apr-15	15-Apr-15	15-Apr-15
Sample Depth (m bgl)					1.0 - 1.2	1.4 - 1.8	0.4 - 0.5	0.1 - 0.2
Soil Type		Fill Soil			Fill	Fill	Fill	Fill
Heavy Metals (mg/kg)								
Arsenic	20	16.3	70	80	65	69	33	17
Cadmium	3	0.21	10	400	2.8	49	1.3	0.83
Chromium ²	460	25.4	370	2,700	61	1980	40	27
Copper	>10,000	25.0	270	>10,000	560	41000	630	91
Lead	210	128.8	220	880	3500	10600	2800	1390
Mercury	310	0.20	1	1,800	1.08	3.6	0.53	0.45
Nickel	400 ³	18.0	52	600 ¹⁰	173	16500	67	24
Zinc	7,400 ⁵	166.8	410	14,000 ⁴	1490	7400	900	670
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg)								
Acenaphthene	860	0.055	0.5	-	0.26	0.07	0.35	0.13
Acenaphthylene	525	0.069	0.64	-	2.8	1.60	1.69	0.98
Anthracene	8,700	0.113	1.1	-	2.9	1.10	4.0	1.06
Benzo[a]anthracene	#	0.47	1.6	#	21	10.9	21	8.4
Benzo[a]pyrene (BAP)	#	0.595	1.6	#	27	15.2	23	10.0
Benzo[b]fluoranthene + Benzo[j]fluoranthene	#	0.947	-	#	32	20.0	27	12.4
Benzo[g,h,i]perylene	-	0.459	-	-	26	15.0	17.5	7.6
Benzo[k]fluoranthene	#	0.296	-	#	13.2	8.1	10.7	4.9
Chrysene	#	0.539	2.8	#	18	9.4	15.9	7.5
Dibenzo[a,h]anthracene	#	0.112	0.26	#	3.7	2.3	2.8	1.28
Fluoranthene	#	1.345	5.1	#	40	14.9	42	17.7
Fluorene	810	0.06	0.54	-	0.53	0.13	0.55	0.25
Indeno(1,2,3-c,d)pyrene	#	0.385	-	#	24	14.5	17.5	7.7
Naphthalene	63 ⁵	0.029	2.1	-	0.58	0.37	0.40	0.45
Phenanthrene	880	0.703	1.5	-	9.6	32.3	15.8	5.4
Pyrene	1,600 ⁵	1.362	2.6	-	39	21	43	18.8
Benzo[a]pyrene (BAP) equivalent ⁶	10	0.922	-	40	40.3	23.1	34.0	14.9

Notes:

Underline: Value exceeds background concentrations

Shaded: Value exceeds NES SCS value

Italics: Value exceeds ANZECC guideline value

Shaded: Value exceeds NES SCS and Burwood Landfill waste acceptance criteria

m bgl - metres below ground level

mg/kg - milligrams per kilogram

Indicates criteria for these compounds are addressed using the Benzo(a)pyrene equivalence calculations provided in the NES (refer to Note 1).

A hyphen ("-") indicates criterion not available

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

2. NES criteria presented are for Chromium (VI)

3. Australia National Environment Protection Measure - Assessment of Site Contamination) 1999, updated 2013 Schedule B1, Health Investigation Levels (HIL) for soil contaminants based on residential land use (Class A).

4. Ministry for the Environment (1997) Guide in 5 for Assessing and Managing Contaminated Gasworks Sites in New Zealand, health - based acceptance criteria, non- carcinogenic produce.

5. MIE (2011) Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand: Module 4 – Tier 1 Soil Screening Criteria, New Zealand Ministry for the Environment, Wellington, New Zealand. Values for shallow (<1m) sandy silt.

6. Benzo(a)pyrene equivalent concentration calculated as the sum of the carcinogenic PAHs in accordance with the methodology published in the NES.

7. Environment Canterbury Background Concentrations for metals are taken from ECan 2007a (Level 2, maximum values for all Christchurch soil groups) and PAHs are taken from Ecan 2007b.

8. ISQG-High Sediment Quality Criteria from Australian and New Zealand Environment and Conservation Council (ANZECC) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, October 2000.

9. Burwood Landfill has adopted the NES (2011) soil quality guidelines for protection of human health for a recreational land use.

10. Burwood Landfill numbers for nickel and zinc are per David Harris with CCC (conversation between Warren Sharp of Coffey and David Harris on 16/7/14).

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**Appendix A – Environment Canterbury LLUR
Statement**



Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828

F. 03 365 3194

E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information. For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

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Property Statement from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.



Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

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

www.ecan.govt.nz

Act 1982

Date:	14 April 2015
Land Parcels:	s 9(2)(a)



The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

There are no sites associated with the area of enquiry.

Information held about the sites on the Listed Land Use Register

There are no sites associated with the area of enquiry.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number [**s 9\(2\)\(a\)**](tel:s9(2)(a))

Disclaimer:

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

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

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

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Listed Land Use Register

What you need to know

What is the Listed Land Use Register (LLUR)?

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

Why do we need the LLUR?

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

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

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

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

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

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

We have two main ways of identifying HAIL sites:

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

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

How does Environment Canterbury classify sites on the LLUR?

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

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

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

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

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

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



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

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

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

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

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



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

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

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

IMPORTANT!

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



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

Contact us

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

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

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

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:

Calling from Christchurch: (03) 353 9007

Calling from any other area: 0800 EC INFO (32 4636)



Everything is connected

Promoting quality of life through balanced resource management.

www.ecan.govt.nz

E13/101

Listed Land Use Register

19-D-02771

Site categories and definitions

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

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

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

Not investigated:

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

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

At or below background concentrations:

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

Below guideline values for:

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

Managed for:

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

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

Partially investigated:

The site has been partially investigated. Results:

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

Significant adverse environmental effects:

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

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

Contaminated:

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

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

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

Verified non-HAIL:

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

Please contact Environment Canterbury for further information:

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



**Environment
Canterbury**
Regional Council
Kaunihera Taiao ki Waitaha

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Appendix B - Historical Aerial Photographs



s 9(2)(a)

2011 Aerial Photograph

Information in this map has been derived from various sources including the Kaikoura District, Hurunui District, Waimakariri District, Christchurch District, Environment Canterbury Regional Council, Selwyn District, Ashburton District, Waimate District, Mackenzie District, Timaru District and Waitaki District's databases.

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Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.



Scale: 1:437 @A3

Map Created by Canterbury Maps on 4:53:18 p.m.

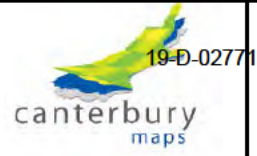
s 9(2)(a)





s 9(2)(a)





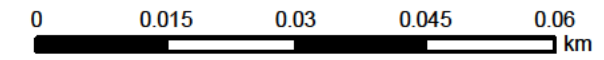
s 9(2)(a)

- 1984 Aerial Photograph

Information in this map has been derived from various sources including the Kaikoura District, Hurunui District, Waimakariri District, Christchurch District, Environment Canterbury Regional Council, Selwyn District, Ashburton District, Waimate District, Mackenzie District, Timaru District and Waitaki District's databases.

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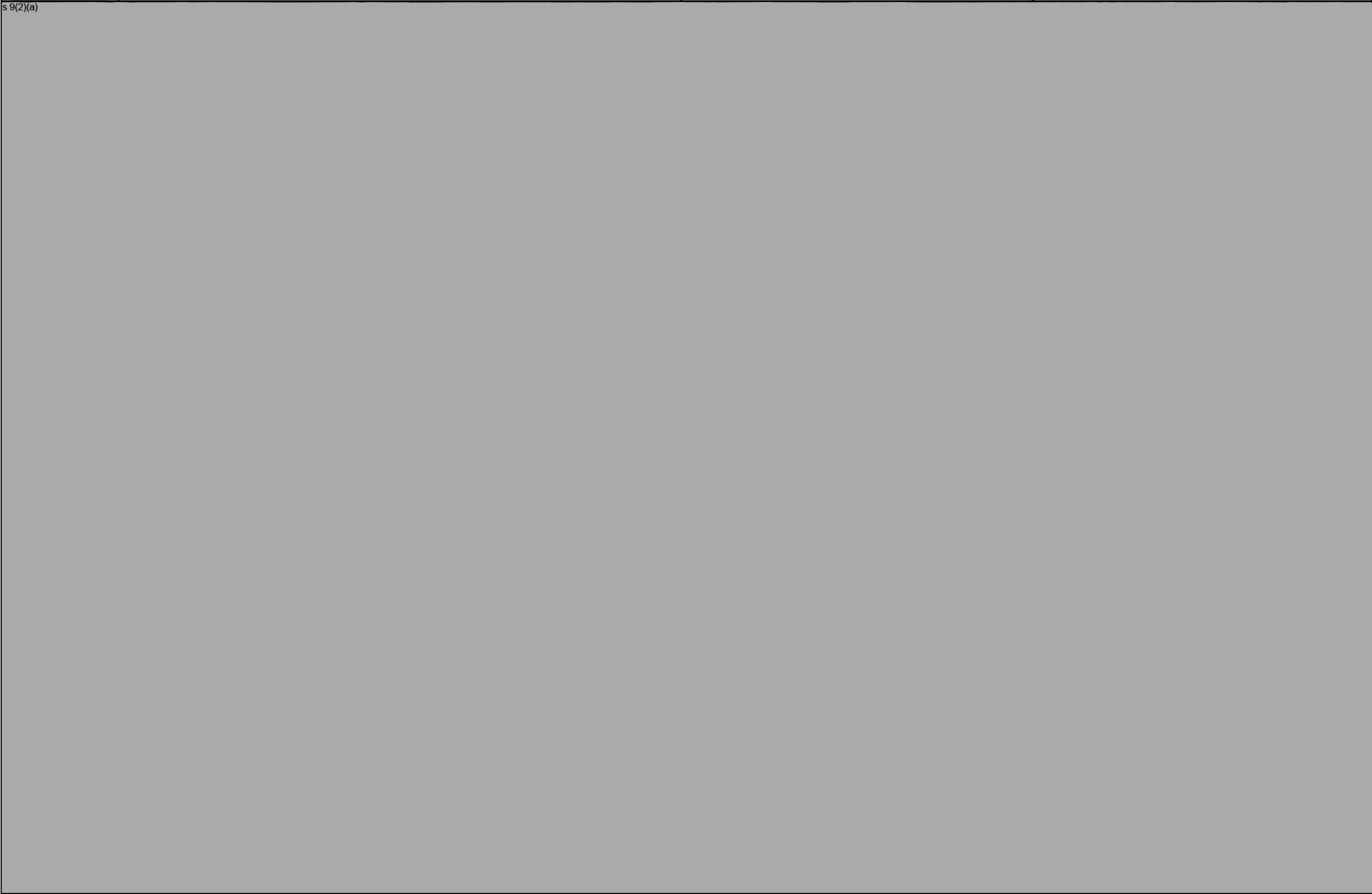
Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.

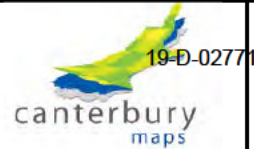


Scale: 1:874 @A3

Map Created by Canterbury Maps on 4:42:06 p.m.

s 9(2)(a)





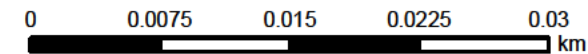
s 9(2)(a)

1973 Aerial Photograph

Information in this map has been derived from various sources including the Kaikoura District, Hurunui District, Waimakariri District, Christchurch District, Environment Canterbury Regional Council, Selwyn District, Ashburton District, Waimate District, Mackenzie District, Timaru District and Waitaki District's databases.

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Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.



Scale: 1:437 @A3

Map Created by Canterbury Maps on 4:32:36 p.m.

s 9(2)(a)



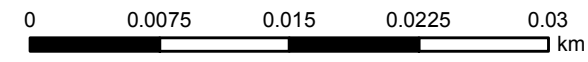


s 9(2)(a) - 1965 Aerial Photograph

Information in this map has been derived from various sources including the Kaikoura District, Hurunui District, Waimakariri District, Christchurch District, Environment Canterbury Regional Council, Selwyn District, Ashburton District, Waimate District, Mackenzie District, Timaru District and Waitaki District's databases.

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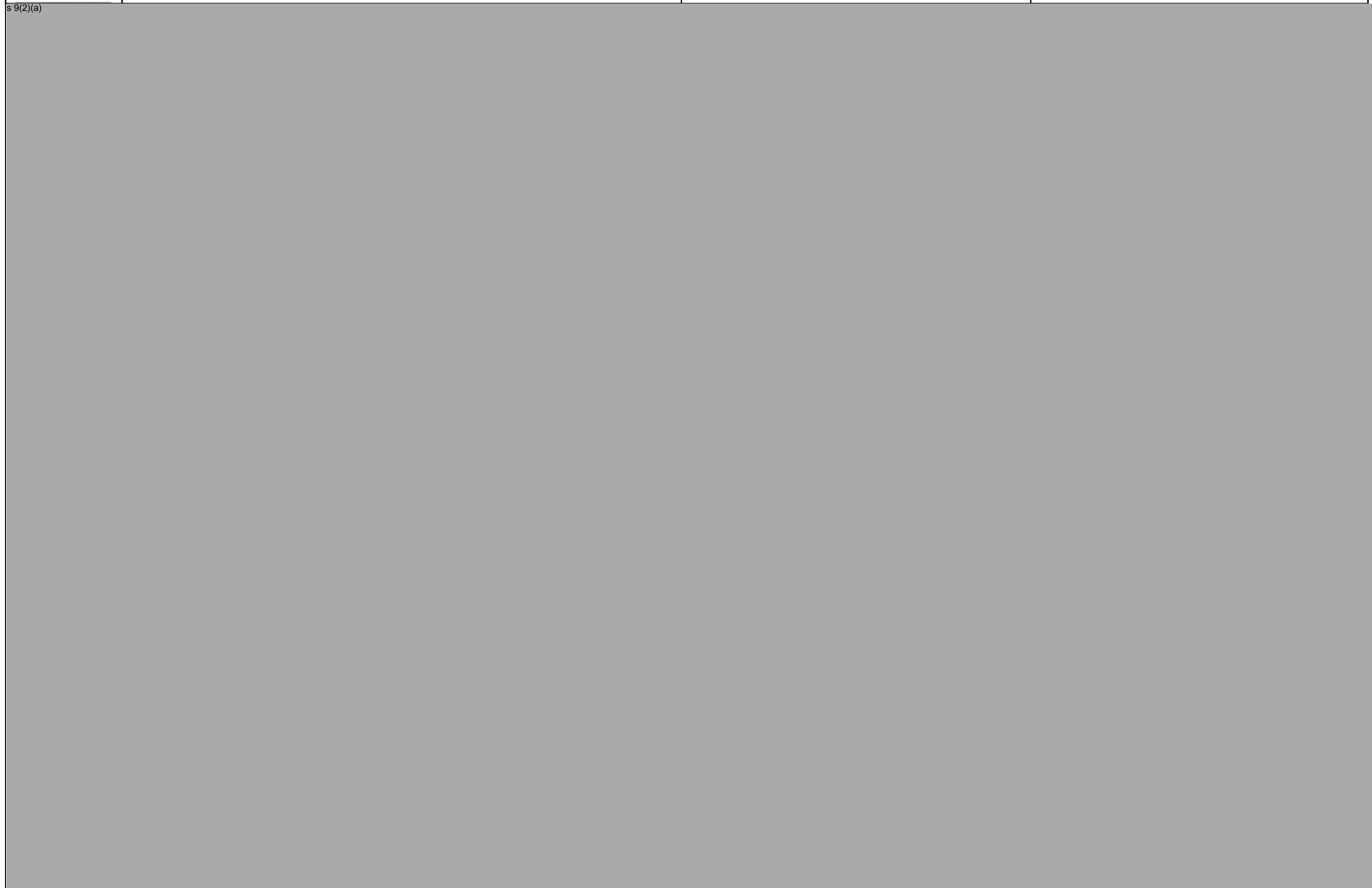
Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.

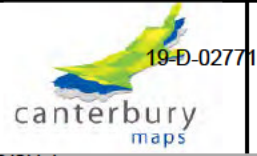


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s 9(2)(a)





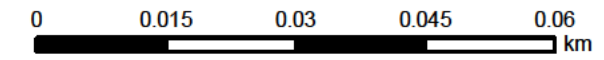
s 9(2)(a)

- 1955 Aerial Photograph

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Scale: 1:874 @A3

Map Created by Canterbury Maps on 4:14:56 p.m.

s 9(2)(a)



19-D-02771

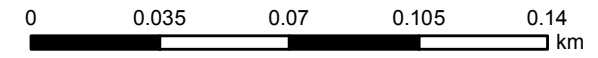
s 9(2)(a)

1946 Aerial Photograph

Information in this map has been derived from various sources including the Kaikoura District, Hurunui District, Waimakariri District, Christchurch District, Environment Canterbury Regional Council, Selwyn District, Ashburton District, Waimate District, Mackenzie District, Timaru District and Waitaki District's databases.

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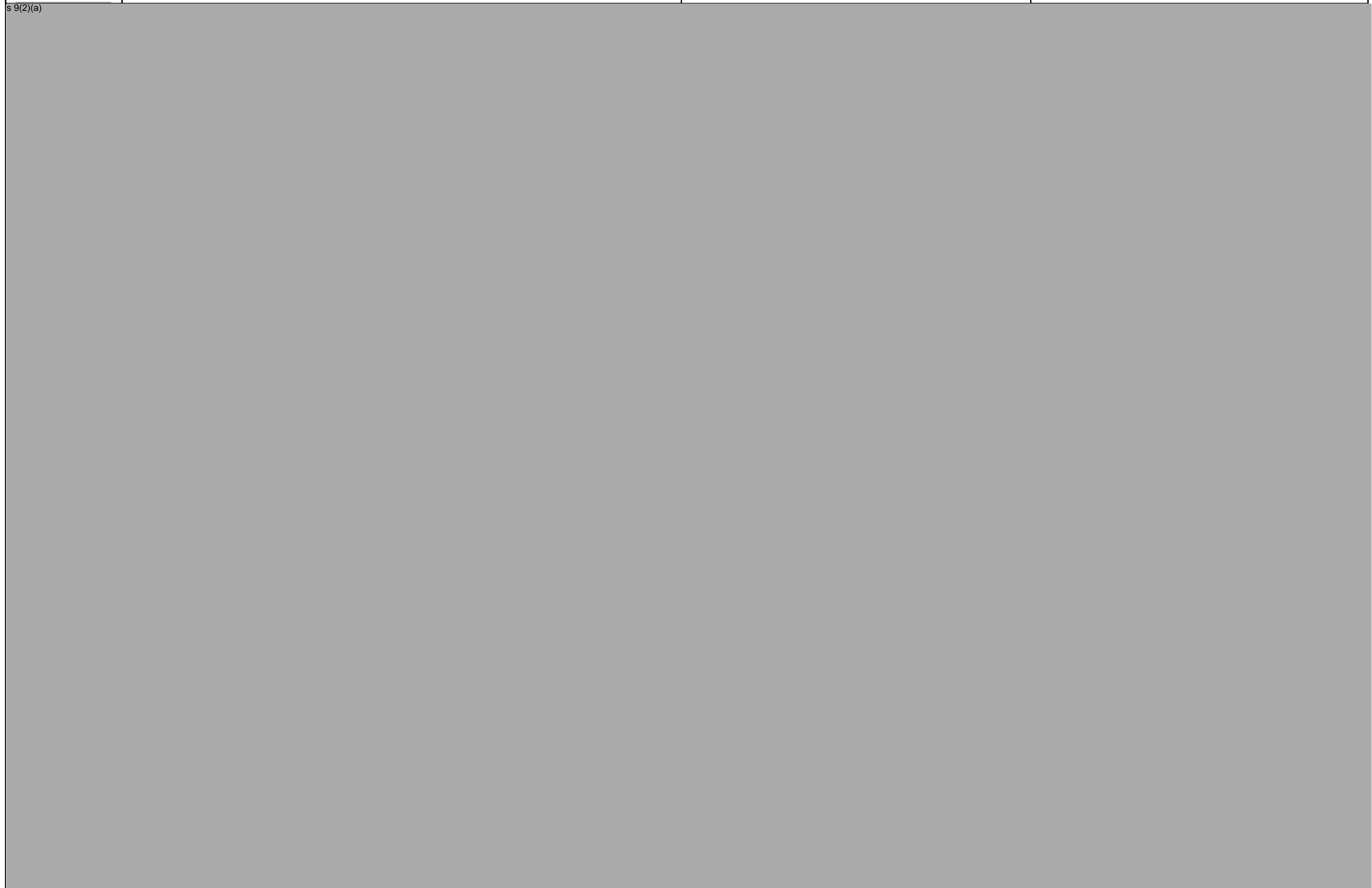
Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.

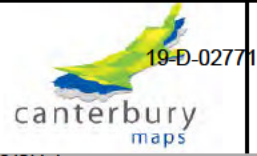


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Map Created by N.Morgan on 9:15:20 a.m.

s 9(2)(a)





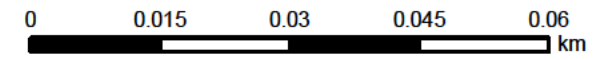
s 9(2)(a)

1941 Aerial Photograph

Information in this map has been derived from various sources including the Kaikoura District, Hurunui District, Waimakariri District, Christchurch District, Environment Canterbury Regional Council, Selwyn District, Ashburton District, Waimate District, Mackenzie District, Timaru District and Waitaki District's databases.

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Information on this map may not be used for the purposes of any legal disputes. The user should independently verify the accuracy of any information before taking any action in reliance upon it.



Scale: 1:874 @A3

Map Created by N.Morgan on 3 05:35 p.m.

s 9(2)(a)



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Appendix C – Field Forms and Borehole Logs



DAILY FIELD SUMMARY

Project No.	ENNZCHRI52154AA
Date:	15/4/15
Page	1 of 7

Project Name: s 9(2)(a) Christchurch

Field Personnel (Initials) S.F. N.M.

Project Manager (Initials): W. Sharp

Time	Description of Tasks Undertaken: (Include details onsite, all personnel, standby, phone calls)
9.30	Went on site and completed a site walk over, taking pictures of the area and deciding on useful sample areas.
	Completed relevant H.S.E and Task Forms. Cleaned Gear and got relevant equipment ready for use. Completed required field work, taking samples, logging soils, testing PID, taking photos
	Stored samples appropriately and completed relevant forms. Stored samples appropriately and completed relevant forms. Cleaned gear and affected areas. Left site.
	- site was pre-located
	- owner not home
	- day was raining & windy

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s 9(2)(a)



Relea

Engineering Log - Hand Auger

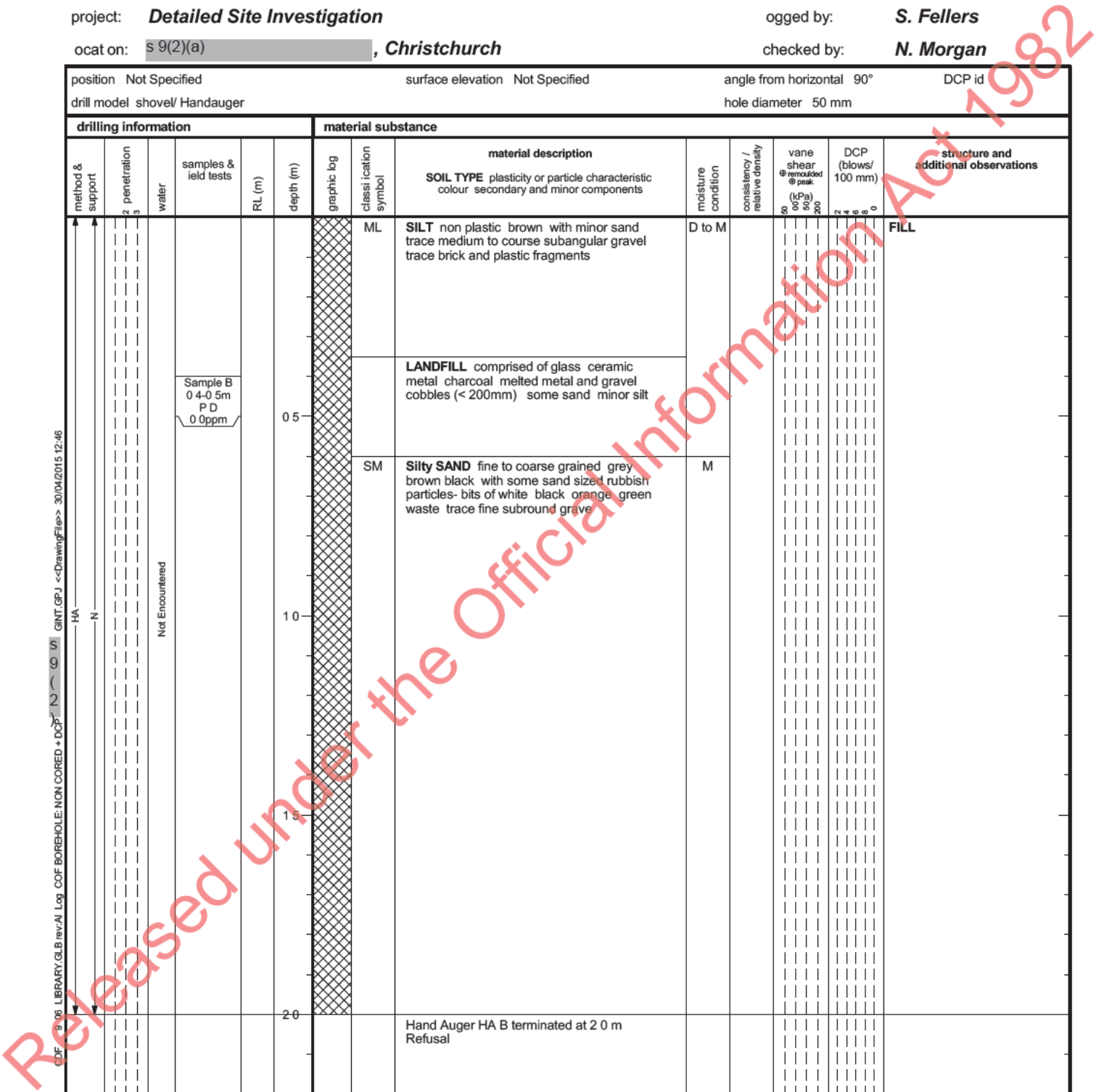
Borehole ID: **HA:B**
 sheet: 1 of 1
 project no: **ENNZCHRI52154AA**
 date started: **15 Apr 2015**
 date completed: **15 Apr 2015**
 logged by: **S. Fellers**
 checked by: **N. Morgan**

client: **TOWER c-/ Stream**
 principal: -
 project: **Detailed Site Investigation**
 location: **Section 9(2)(a), Christchurch**

position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id:
 drill model: shovel/ Handauger hole diameter: 50 mm

drilling information				material substance									
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear (remoulded @ peak) (kPa)	DCP (blows/100 mm)	structure and additional observations
HA	N	Not Encountered	Sample B 0.4-0.5m P.D. 0.0ppm		0.5	[Cross-hatched pattern]	ML	SILT non plastic brown with minor sand trace medium to coarse subangular gravel trace brick and plastic fragments	D to M				FILL
								LANDFILL comprised of glass ceramic metal charcoal melted metal and gravel cobbles (<200mm) some sand minor silt					
					1.0		SM	Silty SAND fine to coarse grained grey brown black with some sand sized rubbish particles- bits of white black orange green waste trace fine subround gravel	M				
					2.0			Hand Auger HA B terminated at 2.0 m Refusal					

method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger	support M mud N nil C casing penetration water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SP) N* SP - sample recovered Nc SP with solid cone VS vane shear peak/remoulded (kPa) R reusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet S saturated Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
---	---	---	---	--



C:\DF\9108 LIBRARY\GLB\rev\A1 Log COF BOREHOLE: NON CORED + DCP\N\10\15\12\46 GINT.GPJ <<DrawingFile>> 30/04/2015 12:46

Engineering Log - Hand Auger

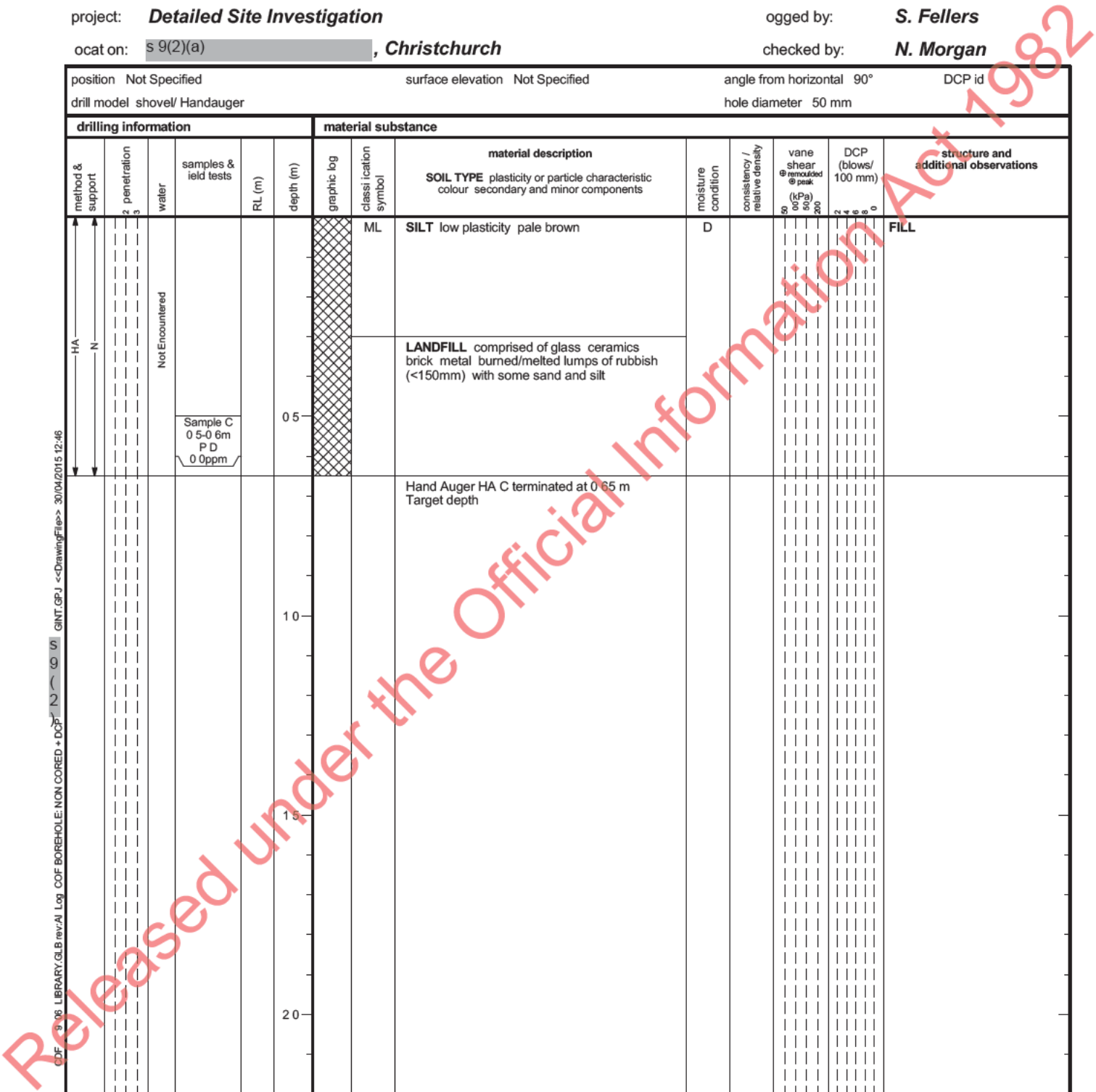
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 sheet: 1 of 1
 project no: **ENNZCHRI52154AA**
 date started: **15 Apr 2015**
 date completed: **15 Apr 2015**
 logged by: **S. Fellers**
 checked by: **N. Morgan**

content: **TOWER c-/ Stream**
 principal: -
 project: **Detailed Site Investigation**
 location: **Section 9(2)(a), Christchurch**

position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id:
 drill model: shovel/ Handauger hole diameter: 50 mm

drilling information				material substance									
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear (kPa)	DCP (blows/100 mm)	structure and additional observations
HA	N	Not Encountered	Sample C 0.5-0.6m P.D. 0.0ppm		0.5	[Cross-hatched pattern]	ML	SILT low plasticity pale brown	D				FILL
								LANDFILL comprised of glass ceramics brick metal burned/melted lumps of rubbish (<150mm) with some sand and silt					
								Hand Auger HA C terminated at 0.65 m Target depth					

method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger	support M mud C casing N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SP) N* SP - sample recovered Nc SP with solid cone VS vane shear peak/remoulded (kPa) R reusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
* bit shown by suffix eg AD/ B blank bit C bit V V bit	penetration no resistance ranging to refusal	water 10-Oct-12 water level on date shown water inflow water outflow	moisture D dry M moist W wet S saturated Wp plastic limit Wl liquid limit	



C:\DF\908 LIBRARY\GLB\rev\A\ Log_COFF_BOREHOLE_NON_CORED + DCP\N\GINT.GPJ <<DrawingFiles>> 30/04/2015 12:46

Engineering Log - Hand Auger

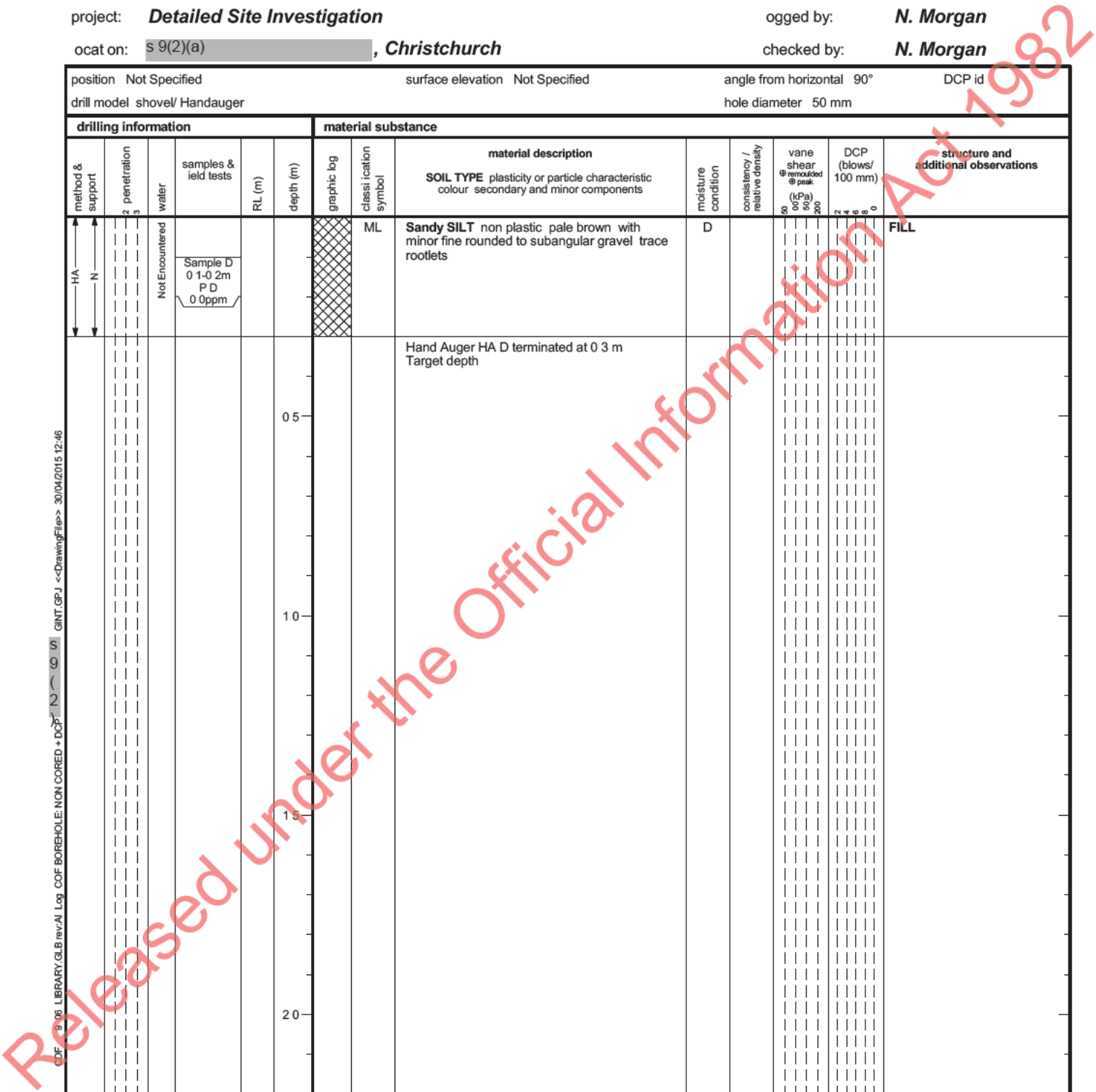
Borehole ID: **HA:D**
 sheet: 1 of 1
 project no: **ENNZCHRI52154AA**
 date started: **15 Apr 2015**
 date completed: **15 Apr 2015**
 logged by: **N. Morgan**
 checked by: **N. Morgan**

client: **TOWER c-/ Stream**
 principal: -
 project: **Detailed Site Investigation**
 location: **Section 9(2)(a), Christchurch**

position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id:
 drill model: shovel/ Handauger hole diameter: 50 mm

drilling information				material substance									
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	vane shear (remoulded @ peak) (kPa)	DCP (blows/100 mm)	structure and additional observations
HA	N	Not Encountered	Sample D 0 1-0 2m P D 0 0ppm		0.5		ML	Sandy SILT non plastic pale brown with minor fine rounded to subangular gravel trace rootlets	D				FILL
					1.5			Hand Auger HA D terminated at 0.3 m Target depth					
					2.0								

method AD auger drilling* AS auger screwing* HA hand auger W washbore HA hand auger	support M mud N nil C casing penetration water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SP) N* SP - sample recovered Nc SP with solid cone VS vane shear peak/remoulded (kPa) R reusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet S saturated Wp plastic limit Wl liquid limit	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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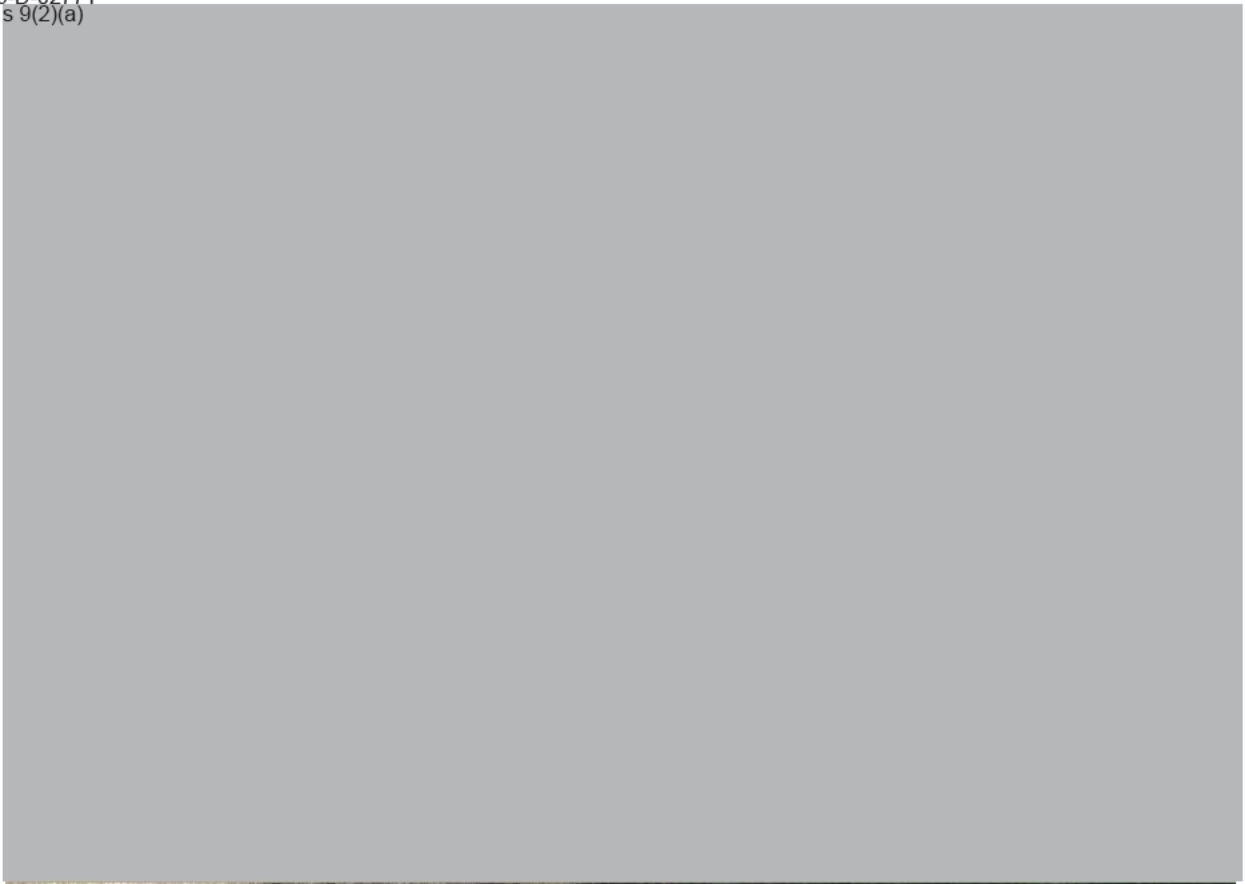


C:\DF\908 LIBRARY\GLB\rev\AI Log COF BOREHOLE: NON CORED + DCP\N\0 UN GINT.GPJ <<DrawingFiles>> 30/04/2015 12:46

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Appendix D – Site Photographs

19-D-02771
s 9(2)(a)




82

Photograph 2: Sample location A, sample depths.

s 9(2)(a)



Rel

CLIENT: TOWER Insurance Ltd C/- Stream Group New Zealand Ltd	PROJECT: 52154AA	DESIGNED: WS	SITE PHOTOGRAPHS
	DWG #: NA	DRAWN: NM	
PROJECT TITLE: s 9(2)(a) s 9(2)(a) Christchurch	REVISION:	STATUS: FINAL	
	SCALE: NA		
	DATE: NA		
			Page 1 of 3

Photograph 3: Sample location B

s 9(2)(a)



82

Photograph 4: Sample location C

s 9(2)(a)



all

Rel

CLIENT: TOWER Insurance Ltd Cl- Stream
Group New Zealand Ltd

PROJECT: 52154AA

DESIGNED: WS

SITE PHOTOGRAPHS

DWG #: NA

DRAWN: NM

REVISION:

PROJECT TITLE: s 9(2)(a) ,
Christchurch

SCALE: NA

STATUS: FINAL

DATE: NA



19_D-02771


Photograph 5: Sample location D

s 9(2)(a)



82

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CLIENT: TOWER Insurance Ltd Cl- Stream Group New Zealand Ltd	PROJECT: 52154AA	DESIGNED: WS	SITE PHOTOGRAPHS
	DWG #: NA	DRAWN: NM	
PROJECT TITLE: s 9(2)(a) Christchurch	REVISION:	STATUS: FINAL	 Page 3 of 3
	SCALE: NA		
	DATE: NA		

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Appendix E – Laboratory Results



ANALYSIS REPORT

Client:	Coffey Geotechnics (NZ) Ltd	Lab No:	1413456	SPV1
Contact:	W Sharp C/- Coffey Geotechnics (NZ) Ltd PO Box 1872 CHRISTCHURCH 8140	Date Registered:	17-Apr-2015	
		Date Reported:	24-Apr-2015	
		Quote No:	47081	
		Order No:	ENVI-10207	
		Client Reference:	ENNZCHR152154AA s 9(2)(a)	
		Submitted By:	Nicole Morgan	

Sample Type: Soil

Sample Name:	A (1.0-1.2)	A (1.4-1.8)	B (0.4-0.5)	D (0.1-0.2)	
15-Apr-2015	15-Apr-2015	15-Apr-2015	15-Apr-2015	15-Apr-2015	
Lab Number:	1413456.1	1413456.2	1413456.3	1413456.4	
Individual Tests					
Dry Matter	g/100g as rcvd	85	81	87	88
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg					
Total Recoverable Arsenic	mg/kg dry wt	65	69	33	17
Total Recoverable Cadmium	mg/kg dry wt	2.8	49	1.30	0.83
Total Recoverable Chromium	mg/kg dry wt	61	1,980	40	27
Total Recoverable Copper	mg/kg dry wt	560	41,000	630	91
Total Recoverable Lead	mg/kg dry wt	3,500	10,600	2,800	1,390
Total Recoverable Mercury	mg/kg dry wt	1.08	3.6	0.53	0.45
Total Recoverable Nickel	mg/kg dry wt	173	16,500	67	24
Total Recoverable Zinc	mg/kg dry wt	1,490	7,400	900	670
Polycyclic Aromatic Hydrocarbons Screening in Soil					
Acenaphthene	mg/kg dry wt	0.26	0.07	0.35	0.13
Acenaphthylene	mg/kg dry wt	2.8	1.60	1.69	0.98
Anthracene	mg/kg dry wt	2.9	1.10	4.0	1.06
Benzo[a]anthracene	mg/kg dry wt	21	10.9	21	8.4
Benzo[a]pyrene (BAP)	mg/kg dry wt	27	15.2	23	10.0
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	32	20	27	12.4
Benzo[g,h,i]perylene	mg/kg dry wt	26	15.0	17.5	7.6
Benzo[k]fluoranthene	mg/kg dry wt	13.2	8.1	10.7	4.9
Chrysene	mg/kg dry wt	18.0	9.4	15.9	7.5
Dibenzo[a,h]anthracene	mg/kg dry wt	3.7	2.3	2.8	1.28
Fluoranthene	mg/kg dry wt	40	14.9	42	17.7
Fluorene	mg/kg dry wt	0.53	0.13	0.55	0.25
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	24	14.5	17.5	7.7
Naphthalene	mg/kg dry wt	0.58	0.37	0.40	0.45
Phenanthrene	mg/kg dry wt	9.6	2.3	15.8	5.4
Pyrene	mg/kg dry wt	39	21	43	18.8

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-4
Heavy metals, screen As,Cd,Cr,Cu,Ni,Pb,Zn,Hg	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1-4



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 *, which are not accredited.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.010 - 0.05 mg/kg dry wt	1-4
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-4
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-4

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

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

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

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DOCUMENT 12

ENGEO

— Expect Excellence —

Environmental Soil Investigation

s 9(2)(a)

Christchurch

Submitted to:

Southern Response

c/- Arrow International (NZ) Ltd

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Executive Summary

ENGEO were engaged by Arrow International (NZ) Ltd (Arrow) to undertake an intrusive soil investigation at s 9(2)(a) as part of the Southern Response Project. As the site has been identified as potentially having a historic hazardous activity or industry undertaken on it, the Resource Management (*National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*) Regulations 2011 (MfE, 2011, herein referred to as the NES)¹ applies, and therefore a detailed site investigation is needed to satisfy consent conditions. The site has been identified as a former landfill site.

ENGEO completed intrusive testing on 7 October 2015 for the analysis of contaminants of concern typically associated with former landfill sites. The soil analysis results show that arsenic, cadmium, lead and BaP eq. were present in concentrations exceeding the Residential land use SCS. The lead and BaP eq. were also present in concentrations which exceeded the Recreational land use criteria and Commercial/Industrial Outdoor Worker criteria. Therefore, a complete exposure pathway exists between the impacted area and the site end users and the site redevelopment workers. To minimise the impacts on the site workers, the surrounding population and environment, mitigation measures should be outlined in a site management plan (SMP).

The soil concentrations returned were above the Recreational land use criteria and are therefore not suitable for disposal at Burwood Landfill. Further analysis of the material identified on site for disposal at Kate Valley Landfill showed that the material from 0.4m bgl was not suitable for disposal at Kate Valley and Waste Management or Chemwaste will have to dispose of the waste. Once final soil volumes and removal depths are confirmed, confirmation of disposal locations can be sought.

Under the Global Consent¹⁰ for work completed on sites identified on the LLUR, this site would be classed as Category C, high risk and work should be undertaken under the appropriate Site Management Plan (SMP).

Table 1: Summary of Results

Item	Risk Category
Site Management Plan	Global Consent SMP Category C
Risk to Site Worker's Health	Present –exceedances of commercial/industrial outdoor worker criteria observed
Potential Waste Disposal Location	TBC – depth to which soil removal occurs needs to be confirmed before waste location is known. Likely to be Waste Management of Chemwaste
Regional Background Concentration	Above background criteria
Potential Risk to Residents Health	Present – exceedances of residential human health criteria in soils sampled

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Figures

Figure 1: Site and Sample Location Plan

Appendices

Appendix 1: CRC LLUR Statement

Appendix 2: Laboratory Results and Chain of Custody Documentation

ENGEO Document Control:

Report Title	Environmental Soil Investigation – s 9(2)(a)				
Project No.	9653.003.171	Document ID	3		
Client	Southern Response	Client Contact	Andrew Buckley		
Distribution (PDF)	Arrow International (NZ) Ltd				
Rev	Date	Revision Details/Status	WP	Author	Reviewer
0		Final	DG	HA	DR

1 Introduction

ENGEO Limited was requested by Arrow International (NZ) Ltd (Arrow) to undertake a soil sampling investigation at s 9(2)(a), Christchurch (herein referred to as “the site”) as part of the Southern Response Project. As the site has been identified as potentially having a historic hazardous activity or industry undertaken on it, the Resource Management (*National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*) Regulations 2011 (MfE, 2011, herein referred to as the NES)¹ applies, and therefore a detailed site investigation is needed to satisfy consent conditions. This investigation was undertaken in general accordance with the Ministry for the Environment (MfE) *Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand* (MfE, 2011a)².

2 Objectives of the Assessment

The objectives of this environmental assessment are:

- Assess concentrations of contaminants of concern (CoC) in soil that will likely be disturbed during home rebuild/repair works at the site;
- Compare CoC concentrations in soil to applicable standards; and
- Provide recommendations for disposal of excess soil generated during the proposed redevelopment.

Please note this report is for redevelopment purposes only and does not seek to provide a full characterisation of soil concentrations across the whole site.

3 Site Information

Table 2: Summary of Site Description

Item	Description
Location:	s 9(2)(a), Christchurch
Legal Description:	s 9(2)(a)
Current Site Use:	Residential
Proposed Site Use:	Residential
Site Area:	706m ²
Geology ² :	Dominantly alluvial sand and silt overbank deposits
Identified HAIL activities:	G3: Landfill sites

3.1 Listed Land Use Register

Canterbury Regional Council (CRC) maintains a Listed Land Use Register (LLUR) of past and current land uses within the Canterbury region. The LLUR documents properties on which potentially hazardous activities have been undertaken.

The potentially hazardous activities are defined on the Hazardous Activities and Industries List (HAIL). Under the NES, the listing of a property on the LLUR as a HAIL site triggers the requirement for a contaminated land assessment prior to development.

The CRC LLUR property statement was requested by ENGEO on the 22 October 2015 and is presented in Appendix 1. The LLUR information is summarised below:

Table 3: Summary of Canterbury Regional Council Listed Land Use Register (CRC LLUR)

Period From	Period To	HAIL Activity (s)	LLUR Category
Pre 1941	Pre 1941	G3: Landfill sites	Not investigated
Additional Information	Evidence of a historical landfill includes the presence of trace ceramic, glass, metal, brick, charcoal and other rubbish encountered up to approximately 2 m below ground level during site investigation activities performed on a number of properties. In addition, the general area bounded by s 9(2)(a) to the south, s 9(2)(a) to the north, s 9(2)(a) to the east and s 9(2)(a) to the west is shown as an unidentified shallow landfill on a Christchurch City Council s 9(2)(a). The landfill likely operated between 1900 and the 1930s and is not evident in the earliest aerial photography available for the area.		

3.2 Historical Aerial Photograph Review

Aerial photographs dating from 1941 to 2011 have been reviewed. The relevant visible features are summarised in Table 4.

Table 4: Aerial Photographs

Date	Description
1941	The site is unoccupied and appears to be part of a larger agricultural area. Land to the north and south of the site is being used for residential land use, whereas land to the east and west appears to be unoccupied.
1946	A residential house is present on the site. The surrounding land use is predominantly residential with some agricultural/unoccupied land.
1955, 1965, 1973, 1984, 1994, 2004, 2011	The site remains the same with the addition of a garage/outhouse to the north east of the house. The surrounding land use is predominantly residential.

4 Potential Issues

The MfE provides a list of hazardous substances typically associated with each HAIL activity or industry. Using this as a guide, ENGEO recommended that soil samples collected from the site be analysed for CoCs typically associated with former landfill sites. This includes heavy metals (As, Cd, Cr, Cu, Pb, Ni and Zn), and polycyclic aromatic hydrocarbons (PAHs). The analytical results have been used to provide an assessment of the potential risk to human health from the aforementioned CoCs and the suitability of the land for the proposed land use (residential).

The potential for ground gas associated with the former landfill in the subsurface at the site has not been assessed as part of this assessment but is considered unlikely to be an issue as no filling activities at the site can be identified in the historic aerial photographs for the area and no putrescible material was identified during the intrusive investigation.

5 Site Investigation

ENGEO collected soil samples at the site on 7 October 2015. The environmental investigation comprised the following:

- Collection of five samples from between 0.2 and 0.8m below ground level (bgl). The depth was considered suitable to provide a representative indication of contaminant concentrations that workers could come into contact with during foundation excavations. The samples were also considered suitable to assess disposal options for the excavated material (if any)
- All samples were submitted to R J Hill Laboratories (Hills) for analysis;
- Analysis of the five soil samples for a suite of common heavy metals (As, Cd, Cu, Cr, Hg, Ni, Pb and Zn) and PAHs.

All fieldwork was carried out following ENGEO standard operating procedures for the appropriate field assessments and handling of potentially contaminated soils, including:

1. Each soil sample was assessed for visual and olfactory indicators of contamination;
2. The samples were collected from between 0.2 and 0.8m bgl by a trained and experienced technician using a hand auger. The soil was compressed directly into laboratory supplied containers by the field technicians using a new pair of nitrile gloves for each sample;
3. Prior to sampling, equipment was decontaminated using a triple wash procedure with Decon 90 solution, potable water and deionised water; and
4. Following collection, all samples were placed directly into a chilly bin prior to transport, under standard ENGEO chain of custody procedures, to Hills for analysis.

Quality Assurance and Quality Control

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

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

6 Adopted Investigation Criteria

The specific criteria referenced in this report have been selected in accordance with the NES¹ and the MfE Contaminated Land Management Guidelines No.2 – Hierarchy and Application in New Zealand of Environmental Guideline Values⁶.

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

- Residential land use assuming 10% of produce consumed is home grown; and

- Commercial/industrial land use (based on an outdoor worker scenario).

The first land use scenario is relevant to the current and future use of the site; the latter is being used as a surrogate to assess short term risks to redevelopment workers on site during the earthworks phase of the site redevelopment.

The NES methodology document⁸ notes that the exposure parameters assumed for the maintenance / excavation scenario in other New Zealand guidelines are unrealistic (perhaps by a factor of 10 or more). The technical committee preparing the NES decided that a maintenance / excavation worker scenario should not be included in the NES as sites would not be cleaned up to this standard; it was considered more appropriate that exposures to these workers be limited through the site-specific controls that are required under health and safety legislation. However, this report uses commercial / industrial outdoor worker criteria to get a general sense of potential risks to excavation workers during site redevelopment, and confirm the need for site controls, personal protective equipment etc. during the redevelopment. Note that the commercial / industrial outdoor worker criteria are based on personnel carrying out maintenance activities involving soil exposure to surface or near surface soil during landscaping activities, and occasional shallow excavation for routine underground service maintenance. Exposure to soil is less intensive than would occur during construction works but occurs over a longer period. For a construction worker building a residential home, the soil exposure is limited when compared to a large earthworks project (e.g. for a residential subdivision or industrial development). As such, the commercial / industrial outdoor worker criteria are considered suitable for obtaining a high-level understanding of potential risks to excavation workers during site redevelopment and confirming the need for site controls.

Where appropriate, the standard NES criteria were adjusted according to the requirements for composite samples specified in the MfE (2011) *Contaminated Land Management Guidelines No.5 – Site Investigation and Analysis of Soils*⁵.

To enable disposal of the soil at the Christchurch City Council (CCC) Burwood Landfill, contaminant concentrations must be below the NES recreational land use criteria.

The soil analysis results have also been compared to regional background concentrations for heavy metals⁸ and PAHs⁹. These provide information into the possible disposal options at a cleanfill facility.

6.1 Results

Soil Encountered

No olfactory indicators of contamination were noted in the samples. The surface soil encountered is described in Table 5:

Table 5: Summary of Typical Subsurface Conditions

Hand Auger	Depth (m)	Material Type
HA01	0.0-0.3	Fine to medium SAND with some silt, trace brick and rootlets; brown.
	0.3-1.8	Fine to medium SAND with minor silt; brown.
HA02	0.0-0.3	Fine to medium SAND with minor silt and trace brick and rootlets; brown.
	0.3-1.9	Fine to medium SAND with minor silt; brownish grey. Trace charcoal encountered at 0.7m.
HA03	0.0-0.3	Fine to medium SAND with minor silt; trace porcelain and rootlets; brown.
	0.3-1.2	Fine to medium SAND with minor silt; trace gravel, charcoal and brick; brown.
	1.2-2.7	Fine to medium SAND with minor silt, trace gravel, charcoal and brick.
HA04	0.0-0.2	Fine to medium SAND with minor silt, trace gravel and rootlets; brown.
	0.2-0.9	Fine to medium SAND with minor silt, trace metal, brick, charcoal, clinker and gravel; brown.

Laboratory Test Results

Table 6 compares the concentrations of heavy metals and PAHs with the applicable and available contaminants standards for residential land use and commercial/industrial workers, as well as criteria for recreational land use and regional background criteria (as described in Section 6). Full analytical results are appended in Appendix 2.

Table 6: Sample Laboratory Test Results

Sample Name	HA01 S1	HA02 S1	HA03 S1	HA03 S2	HA04 S1	Human health criteria - Residential Land use ALL PATHWAYS ^a	Human health criteria - Recreational Land use ^a	Human health criteria - Commercial / industrial outdoor worker (unpaved) ^a	Regional background - Trace Elements (Level 2) ^b
Soil Type	SAND	SAND	SAND	SAND	SAND				
Sample Depth, m	0.3	0.5-0.7	0.2-0.3	0.6-0.8	0.4-0.6				
Heavy Metals in soil, mg/kg									
Arsenic	5	6	15	37	25	20	80	70	16.3
Cadmium ^d	<0.10	<0.10	1.7	3.6	3.6	3	400	1,300	0.2
Chromium ^e	14	16	41	50	43	460	2,700	6,300	20.1
Copper	11	8	290	750	520	>10,000	>10,000	>10,000	19.5
Lead	41	21	2,400	4,300	4,100	210	880	3,300	128.8
Nickel	12	12	36	71	64	400 ^e	1,200 ^e	6,000 ^e	18
Zinc	62	52	1,550	3,000	2,500	7,400 ^e	30,000 ^e	400,000 ^e	166.8
Polycyclic Aromatic Hydrocarbons in soil, mg/kg									
BaP eq ^f	0.23	0.07	18.9	41.07	53.09	10	40	35	0.922g

Notes: ^a Human health criteria from the NES³ except where noted:

Bold text indicates that the concentration exceeds the residential land use criterion.

Italics indicates that the concentration exceeds the recreational land use criterion.

Underlined text indicates that the concentration exceeds the commercial/industrial and use criterion.

^b ECan (2007) Background Concentrations of Selected Trace Elements in Canterbury Soils⁶ Exceedances are shaded.

^c Guideline on the Investigation Levels for Soils and Groundwater⁷; Health Investigation Level for 'Standard Residential' land use.

^d Assumes soil pH of 5.

^e Criteria for Chromium VI were conservatively selected.

^f Risk associated with a mixture of carcinogenic PAH's is based on the Benzo(a)pyrene equivalent (BaP Eq.) concentration. The BaP eq. concentration was calculated according to the NES Methodology⁸.

^g ECan (2007) Background Concentrations of Polycyclic Aromatic Hydrocarbons in Christchurch Urban Soils⁹ Exceedances are shaded.

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Discussion

Table 6 shows that arsenic, cadmium, lead and BaP eq. were present in concentrations exceeding the Residential land use criteria. The lead and BaP eq. were also present in concentrations which exceeded the Recreational land use criteria and Commercial/Industrial Outdoor Worker criteria. The soil analysis results were compared to regional background criteria with all of the contaminants tested exceeding the site specific criteria.

Due to the soil analysis results exceeding the Recreational land use criteria and are therefore unsuitable for disposal at Burwood Landfill, the soil samples were analysed for a Toxic Characteristic Leachate Potential (TCLP) test for potential disposal at Kate Valley Landfill. The soil analysis results are shown in Table 7 below.

Table 7: TCLP Sample Laboratory Test Results

Sample Name	HA01 S1	HA02 S1	HA03 S1	HA03 S2	HA04 S1	Kate Valley TCLP Acceptance Criteria
Soil Type	SAND	SAND	SAND	SAND	SAND	
Sample Depth, m	0.3	0.5-0.7	0.2-0.3	0.6-0.8	0.4-0.6	
Heavy Metals in soil, mg/kg						
Antimony	<0.0042	<0.042	0.132	0.086	0.176	0.3
Arsenic	<0.021	<0.021	0.024	0.033	0.036	5
Boron	<0.11	<0.11	0.54	0.76	0.92	20
Cadmium	<0.0011	<0.0011	0.0134	0.028	0.036	1
Chromium	<0.010	<0.010	<0.010	<0.010	<0.010	5
Copper	<0.011	<0.011	0.31	1.67	0.5	5
Iron	<0.2	0.61	<0.42	<0.42	<0.42	20
Lead	0.0124	0.0025	4.9	6.9	11.3	5
Mercury	<0.0021	<0.0021	<0.0021	<0.0021	<0.0021	0.2
Nickel	<0.011	<0.011	0.045	0.060	0.044	2
Silver	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	5
Tin	<0.011	<0.011	<0.011	<0.011	<0.011	20
Zinc	0.094	0.043	9.8	16.8	14.6	10

Notes:
Bold text indicates that the concentration exceeds the Kate Valley Acceptance criteria

Table 7 shows that the lead and zinc were present in HA03S2 and HA04S1 in concentrations which exceed the acceptance criteria for Kate Valley. Final confirmation for acceptance at Kate Valley should be sought once the final foundation design is known.

7 Conceptual Site Model

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

- Source of contamination;
- Receptors that may be exposed to the contamination; and
- An exposure route, where the receptor and contaminants come into contact (e.g. ingestion, inhalation, dermal contact).

The potential source, pathway, receptor linkages at this subject site during site works are provided in Table 8.

Table 8: Conceptual Site Model

Potential Sources	Contaminants of Concern	Exposure Route and Pathways	Receptor	Acceptable Risk?
Former landfill site	Heavy metals PAHs	Dermal contact with impacted soil, incidental ingestion and inhalation of dust during earthworks.	On-site redevelopment construction workers. Future subsurface maintenance workers.	No, commercial / industrial outdoor worker human health criteria exceeded
		Dermal contact with impacted soil, incidental ingestion and inhalation of wind-blown dust.	Future Residential land users	No, residential human health criteria exceeded

The potential for contamination at the site to present a significant risk to the human health of the construction / excavation workers is considered to be present due to contaminant concentrations in soil being above the commercial / industrial outdoor worker criteria.

The potential for contamination at the site to present a significant risk to the health of the future residential land users is also considered to be present due to contaminant concentrations in soil being above the residential land use criteria. However, a full assessment of the suitability of the site for ongoing residential use is outside the scope of this assessment.

8 Conclusions

A summary of the site and the perceived level of risk to human health the contaminants identified present is summarised in Table 8.

Table 8: Summary of Results

Item	Risk Category
Site Management Plan	Global Consent SMP Category C
Risk to Site Worker's Health	Present – exceedances of commercial/industrial outdoor worker criteria observed
Potential Waste Disposal Location	TBC – depth to which soil removal occurs needs to be confirmed before waste location is known
Regional Background Concentration	Above background criteria
Potential Risk to Residents Health	Present – exceedances of residential human health criteria in soils sampled

The soil analysis results show that arsenic, cadmium, lead and BaP eq. were present in concentrations exceeding the Residential land use SCS. The lead and BaP eq. were also present in concentrations which exceeded the Recreational land use criteria and Commercial/Industrial Outdoor Worker criteria. Therefore, a complete exposure pathway exists between the impacted area and the site end users and the site redevelopment workers. To minimise the impacts on the site workers, the surrounding population and environment, mitigation measures should be outlined in a site management plan (SMP).

The soil concentrations returned were above the Recreational land use criteria and are therefore not suitable for disposal at Burwood Landfill. Further analysis of the material identified on site for disposal at Kate Valley Landfill showed that the material from 0.4m bgl was not suitable for disposal at Kate Valley. Once final soil volumes and removal depths are confirmed, confirmation of disposal locations can be sought.

Under the Global Consent¹⁰ for work completed on sites identified on the LLUR, this site would be classed as Category C, high risk and work should be undertaken under the appropriate Site Management Plan (SMP).

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

Site occupants also should be informed of the potential for contamination in the underlying soil and potential long term impacts from this material.

As part of the planned works at the site, the homeowner may wish to also include remediation of the soils in the garden areas of the site. Risk from these soils comes from direct contact and the potential ingestion (mainly from soil attached to vegetables, children eating the soils etc.) of the soil over a long period of time. By removing the potential contact with the soils, you can manage the risks. Remediation could involve the placement of hard-standing over the impacted soils (patio, pathway etc.), the removal of the top soil and replacement or the building up of flower/vegetable beds and the placement of clean soil within those areas.

9 References

1. MfE Oct 2011: Ministry for the Environment Hazardous Activities and Industries List.
2. Forsyth, P.J.; Barrell, D.J.A; Jongens, R. 2008: Sheet 16 - Geology of the Christchurch Area 1:250,000. Institute of Geological and Nuclear Sciences, Lower Hutt.
3. MfE 2012: *Users' guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*.
4. MfE 2011: *Contaminated Land Management Guidelines No 2: Hierarchy and Application in New Zealand of Environmental Guideline Values*.
5. MfE 2011: *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*.
6. ECan (2007) Background Concentrations of Selected Trace Elements in Canterbury Soils. Addendum 1: Additional Samples and Timaru Specific Background Levels. Report prepared for Environment Canterbury by Tonkin & Taylor Limited, Christchurch, New Zealand. Report Number R07/1/2. Tonkin & Taylor Reference: 50875.003.
7. National Environmental Protection Council 1999: *National Environment Protection Measure Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater*.
8. MfE 2011: *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health*.
9. ECan (2007) Background Concentrations of Polycyclic Aromatic Hydrocarbons in Christchurch Urban Soils. Report prepared for Environment Canterbury by Tonkin & Taylor Limited, Christchurch, New Zealand. Report Number: R07/19. Tonkin & Taylor Reference: 50875.004.
10. Christchurch City Council 2014: *Resource Consent No. RMA92026024 Global land use consent for soil disturbance associated with the rebuild and repair of earthquake-damaged residential structures on HAIL land*.

10 Limitations

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

- ii. The recommendations in this report are based on the ground conditions indicated from published sources, site inspections and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the Client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it must be appreciated that actual conditions could vary from the assumed model.
- iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.
- iv. This report is not to be reproduced either wholly or in part without our prior written permission.

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

For and on behalf of ENGEO Limited,

Prepared by:



Hazel Atkins

Engineering/Environmental Geologist

Reviewed by:



David Robotham, CEnvP

Associate Environmental Consultant

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FIGURES

2

s 9(2)(a)

s 9(2)(a)

⊕ = Test Location

Note: All images sourced from Google Maps



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Date	Nov-15	Client	Southern Response c/- Arrow International NZ Ltd		
Drawn by	HA	Project	s 9(2)(a) , Christchurch		
Approved by	DR	Description	Site Location Plan		
Scale	NTS	ENGEO Ref.	9653.003.171_3	Client Ref.	s 9(2)(a)

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APPENDIX 1

LLUR Statement



Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

P. 03 365 3828

F. 03 365 3194

E. ecinfo@ecan.govt.nz

www.ecan.govt.nz

Dear Sir/Madam

Thank you for submitting your property enquiry in regards to our Listed Land Use Register (LLUR) which holds information about sites that have been used, or are currently used for activities which have the potential to have caused contamination.

The LLUR statement provided indicates the location of the land parcel(s) you enquired about and provides information regarding any LLUR sites within a radius specified in the statement of this land.

Please note that if a property is not currently entered on the LLUR, it does not mean that an activity with the potential to cause contamination has never occurred, or is not currently occurring there. The LLUR is not complete, and new sites are regularly being added as we receive information and conduct our own investigations into current and historic land uses.

The LLUR only contains information held by Environment Canterbury in relation to contaminated or potentially contaminated land; other information relevant to potential contamination may be held in other files (for example consent and enforcement files).

If your enquiry relates to a farm property, please note that many current and past activities undertaken on farms may not be listed on the LLUR. Activities such as the storage, formulation and disposal of pesticides, offal pits, foot rot troughs, animal dips and underground or above ground fuel tanks have the potential to cause contamination.

Please contact and Environment Canterbury Contaminated Sites Officer if you wish to discuss the contents of the LLUR statement, or if you require additional information. For any other information regarding this land please contact Environment Canterbury Customer Services.

Yours sincerely

Contaminated Sites Team

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Property Statement from the Listed Land Use Register

Visit www.ecan.govt.nz/HAIL for more information about land uses.



Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

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

www.ecan.govt.nz

Act 1982

Date:	22 October 2015
Land Parcels:	s 9(2)(a)



s 9(2)(a)

Area of Enquiry
 Sites intersecting area of enquiry
 Investigations intersecting area of enquiry

The information presented in this map is specific to the property you have selected. Information on nearby properties may not be shown on this map, even if the property is visible.

Summary of sites:

Site ID	Site Name	Location	HAIL Activity(s)	Category
s 9(2)	s 9(2)(a) Landfill	s 9(2)(a), Christchurch	G3 - Landfill sites;	Not Investigated

Please note that the above table represents a summary of sites and HAILS intersecting the area of enquiry only.

Information held about the sites on the Listed Land Use Register

Site	s 9(2)(a) (Intersects enquiry area.)
Site Address:	s 9(2)(a), Christchurch
Legal Description(s):	s 9(2)(a)

Site Category:

Not Investigated

Definition:

Verified HAIL has not been investigated.

Land Uses (from HAIL):

Period From	Period To	HAIL land use
Pre 1941	Pre 1941	Landfill sites

Notes:

17 Jul 2015

Evidence of a historical landfill includes the presence of trace ceramic, glass, metal, brick, charcoal and other rubbish encountered up to approximately 2 metres below ground level during site investigation activities performed on a number of properties. In addition, the general area bounded by s 9(2)(a) [redacted] to the west is shown as an unidentified shallow landfill on a Christchurch City Council s 9(2)(a) [redacted]. The landfill likely operated between 1900 and the 1930s and is not evident in the earliest aerial photograph available for the area (1941).

Investigations:

There are no investigations associated with this site.

Information held about other investigations on the Listed Land Use Register

For further information from Environment Canterbury, contact Customer Services and refer to enquiry number s 9(2)(a) [redacted]

Disclaimer:

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

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

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

Listed Land Use Register

What you need to know

What is the Listed Land Use Register (LLUR)?

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

Why do we need the LLUR?

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

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

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

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

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

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

We have two main ways of identifying HAIL sites:

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

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

How does Environment Canterbury classify sites on the LLUR?

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

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

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

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

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

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



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

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

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

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

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



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

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

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

IMPORTANT!

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



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

Contact us

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

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

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

Contact Environment Canterbury:

Email: ecinfo@ecan.govt.nz

Phone:

Calling from Christchurch: (03) 353 9007

Calling from any other area: 0800 EC INFO (32 4636)



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www.ecan.govt.nz

E13/101

Listed Land Use Register

19-D-02771

Site categories and definitions

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

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

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

Not investigated:

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

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

At or below background concentrations:

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

Below guideline values for:

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

Managed for:

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

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

Partially investigated:

The site has been partially investigated. Results:

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

Significant adverse environmental effects:

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

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

Contaminated:

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

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

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

Verified non-HAIL:

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

Please contact Environment Canterbury for further information:

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

APPENDIX 2

Laboratory Results and Chain of Custody Documentation

Released under the Official Information Act 1982



ANALYSIS REPORT

Page 1 of 3

Client: Engeo Limited	Lab No: 1485865	SPv2
Contact: H Atkins	Date Registered: 08-Oct-2015	
C/- Engeo Limited	Date Reported: 03-Nov-2015	
PO Box 373	Quote No: 53616	
CHRISTCHURCH 8140	Order No:	
	Client Reference: s 9(2)(a)	
	Submitted By: Carolina Winter	

Amended Report

This report replaces an earlier report issued on the 21 Oct 2015 at 1:49 pm
 Heavy metals and PAH analysis has been added to samples 1485865.1 - .5
 at the client's request.

Sample Type: Soil

Sample Name:	HA01 S1 @ 0.3m 07-Oct-2015 3:10 pm	HA02 S1 @ 0.5-0.7 07-Oct-2015	HA03 S1 @ 0.2-0.3 07-Oct-2015 1:30 pm	HA04 S1 @ 0.4-0.6 07-Oct-2015	HA05 S2 @0.6-0.8 07-Oct-2015
Lab Number:	1485865.1	1485865.2	1485865.3	1485865.4	1485865.5
Individual Tests					
Dry Matter g/100g as rcvd	83	85	86	82	79
TCLP Weight of Sample Taken g	100	100	100	100	100
TCLP Initial Sample pH pH Units	6.8	7.2	7.9	9.0	9.1
TCLP Acid Adjusted Sample pH pH Units	1.6	1.6	1.7	1.9	2.1
TCLP Extractant Type*	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05	NaOH/Acetic acid at pH 4.93 +/- 0.05
TCLP Extraction Fluid pH pH Units	4.9	4.9	4.9	4.9	4.9
TCLP Post Extraction Sample pH pH Units	4.9	4.9	5.1	5.2	5.4
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn					
Total Recoverable Arsenic mg/kg dry wt	5	6	15	25	37
Total Recoverable Cadmium mg/kg dry wt	< 0.10	< 0.10	1.70	3.6	3.7
Total Recoverable Chromium mg/kg dry wt	1	16	41	43	50
Total Recoverable Copper mg/kg dry wt	11	8	290	520	750
Total Recoverable Lead mg/kg dry wt	41	21	2,400	4,100	4,300
Total Recoverable Nickel mg/kg dry wt	12	13	36	64	71
Total Recoverable Zinc mg/kg dry wt	62	52	1,550	2,500	3,000
Polycyclic Aromatic Hydrocarbons Screening in Soil					
Acenaphthene mg/kg dry wt	< 0.03	< 0.03	0.22	0.34	0.25
Acenaphthylene mg/kg dry wt	< 0.03	< 0.03	0.95	2.6	2.2
Anthracene mg/kg dry wt	0.03	< 0.03	1.80	3.6	2.3
Benzo[a]anthracene mg/kg dry wt	0.09	< 0.03	10.6	27	19.9
Benzo[a]pyrene (BAP) mg/kg dry wt	0.15	< 0.03	11.9	36	28
Benzo[b]fluoranthene + Benzo[j] fluoranthene mg/kg dry wt	0.17	< 0.03	16.7	45	34
Benzo[g,h,i]perylene mg/kg dry wt	0.10	< 0.03	7.9	25	19.5
Benzo[k]fluoranthene mg/kg dry wt	0.08	< 0.03	6.7	18.1	14.1
Chrysene mg/kg dry wt	0.12	< 0.03	9.5	23	17.9
Dibenzo[a,h]anthracene mg/kg dry wt	< 0.03	< 0.03	2.2	4.6	3.6
Fluoranthene mg/kg dry wt	0.30	0.03	28	55	39
Fluorene mg/kg dry wt	< 0.03	< 0.03	0.30	0.54	0.39
Indeno(1,2,3-c,d)pyrene mg/kg dry wt	0.15	< 0.03	10.2	27	21
Naphthalene mg/kg dry wt	< 0.13	< 0.13	0.16	0.37	0.29
Phenanthrene mg/kg dry wt	0.13	< 0.03	9.9	18.5	11.4
Pyrene mg/kg dry wt	0.30	0.03	23	48	36



Sample Type: Soil					
Sample Name:	HA01 S1 @ 0.3m 07-Oct-2015 3:10 pm	HA02 S1 @ 0.5-0.7 07-Oct-2015	HA03 S1 @ 0.2-0.3 07-Oct-2015 1:30 pm	HA04 S1 @ 0.4-0.6 07-Oct-2015	HA03 S2 @0.6-0.8 07-Oct-2015
Lab Number:	1485865.1	1485865.2	1485865.3	1485865.4	1485865.5

Sample Type: Aqueous					
Sample Name:	HA01 S1 @ 0.3m [TCLP extract]	HA02 S1 @ 0.5-0.7 [TCLP extract]	HA03 S1 @ 0.2-0.3 [TCLP extract]	HA04 S1 @ 0.4-0.6 [TCLP extract]	HA03 S2 @0.6-0.8 [TCLP extract]
Lab Number:	1485865.6	1485865.7	1485865.8	1485865.9	1485865.10

Individual Tests						
Total Antimony	g/m ³	< 0.0042	< 0.0042	0.132	0.176	0.086
Total Boron	g/m ³	< 0.11	< 0.11	0.54	0.76	0.92
Hexavalent Chromium*	g/m ³	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Iron	g/m ³	< 0.42	0.61	< 0.42	< 0.42	< 0.42
Total Mercury	g/m ³	< 0.0021	< 0.0021	< 0.0021	< 0.0021	< 0.0021
Total Silver	g/m ³	< 0.0022	< 0.0022	< 0.0022	< 0.0022	< 0.0022
Total Tin	g/m ³	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011

Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m ³	< 0.021	< 0.021	0.024	0.036	0.033
Total Cadmium	g/m ³	< 0.0011	< 0.0011	0.0134	0.036	0.028
Total Chromium	g/m ³	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011
Total Copper	g/m ³	< 0.011	< 0.011	0.31	0.50	1.67
Total Lead	g/m ³	0.0124	0.0025	4.9	11.3	6.9
Total Nickel	g/m ³	< 0.011	< 0.011	0.045	0.044	0.060
Total Zinc	g/m ³	0.094	0.043	9.8	14.6	16.8

Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene*	g/m ³	< 0.00010	< 0.00010	0.00020	0.00021	0.00027
Acenaphthylene	g/m ³	< 0.00010	< 0.00010	< 0.00010	0.00056	< 0.00010
Anthracene	g/m ³	< 0.00010	< 0.00010	0.00021	0.00056	0.00032
Benzo[a]anthracene	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m ³	< 0.00010	< 0.00010	0.00082	0.00156	0.00148
Fluorene	g/m ³	< 0.0002	< 0.0002	0.0002	0.0004	0.0003
Indeno(1,2,3-c,d)pyrene	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m ³	< 0.0004	< 0.0004	0.0018	0.0037	0.0029
Pyrene	g/m ³	< 0.0002	< 0.0002	0.0006	0.0013	0.0012

Analyst's Comments	
Appendix No 1 - Chain of Custody	

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-5
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-5
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-5

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1-5
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.010 - 0.05 mg/kg dry wt	1-5
TCLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1311	-	1-5
TCLP Profile			
TCLP Weight of Sample Taken	Gravimetric. US EPA 1311.	0.1 g	1-5
TCLP Initial Sample pH	pH meter. US EPA 1311.	0.1 pH Units	1-5
TCLP Acid Adjusted Sample pH	pH meter. US EPA 1311.	0.1 pH Units	1-5
TCLP Extractant Type*	US EPA 1311.	-	1-5
TCLP Extraction Fluid pH	pH meter. US EPA 1311.	0.1 pH Units	1-5
TCLP Post Extraction Sample pH	pH meter. US EPA 1311.	0.1 pH Units	1-5

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E 22nd ed. 2012 (modified).	-	6-10
Total acid digest for Silver analysis	Boiling nitric / hydrochloric acid digestion (5:1 ratio). APHA 3030 F (modified) 22nd ed. 2012.	-	6-10
Total Antimony	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 22nd ed. 2012.	0.0042 g/m ³	6-10
Total Boron	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 22nd ed. 2012.	0.11 g/m ³	6-10
Hexavalent Chromium*	Diphenylcarbazide colorimetry. Discrete Analyser. APHA 3500 Cr B (modified from manual analysis) 22nd ed. 2012.	0.010 g/m ³	6-10
Total Iron	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 22nd ed. 2012.	0.42 g/m ³	6-10
Total Mercury	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 22nd ed. 2012.	0.0021 g/m ³	6-10
Total Silver	Boiling nitric / hydrochloric acid digestion (5:1 ratio), ICP-MS, screen level. APHA 3125 B 22nd ed. 2012.	0.0022 g/m ³	6-10
Total Tin	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 22nd ed. 2012.	0.011 g/m ³	6-10
Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, screen level	0.0011 - 0.021 g/m ³	6-10
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq*	Liquid / liquid extraction, SPE (if required), GC-MS SIM analysis [KBIs:4736,2695]	0.00010 - 0.0005 g/m ³	6-10

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

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

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



Carol Rodgers-Carroll BA, NZCS
Client Services Manager - Environmental Division

ENVIRONMENTAL Analysis Request Form

Hill Labor **148 5865**

CLIENT

Name **ENGE0 Ltd.** [160117]
PO Box 373
Christchurch 8140

1 Clyde Street, Teleph
 Private Bag 3205, Facsi

Received by: Jennifer Singlewood



Hill Laboratories office use only
 Date In Job # No. of Samples

Phone: 03 328 9012 Fax:

Client Reference: s 9(2)(a) (Project Code)

Quote Number: 53616 Order No: (Cost Centre)

Submitted By Hazel Atkins

Charge To: ENGE0 Ltd. [160117]

RESULTS TO

Mail Client Mail Submitter

Fax Results Email Results
 hatkins@engeo.co.nz

C.O.C & coversheet to be scanned and emailed back

Additional Information

Please scan and email the COC form to hatkins@engeo.co.nz

Chain of Custody Record

Delivered to Hill Laboratories (Depatched by) Date & Time: 7-10-15 Name: H. Atkins Signature: [Signature]
 Received at Hill Laboratories Date & Time: Name: Jennifer Singlewood Signature: [Signature]
 Condition Ambient Temp Chilled 13.2 °C

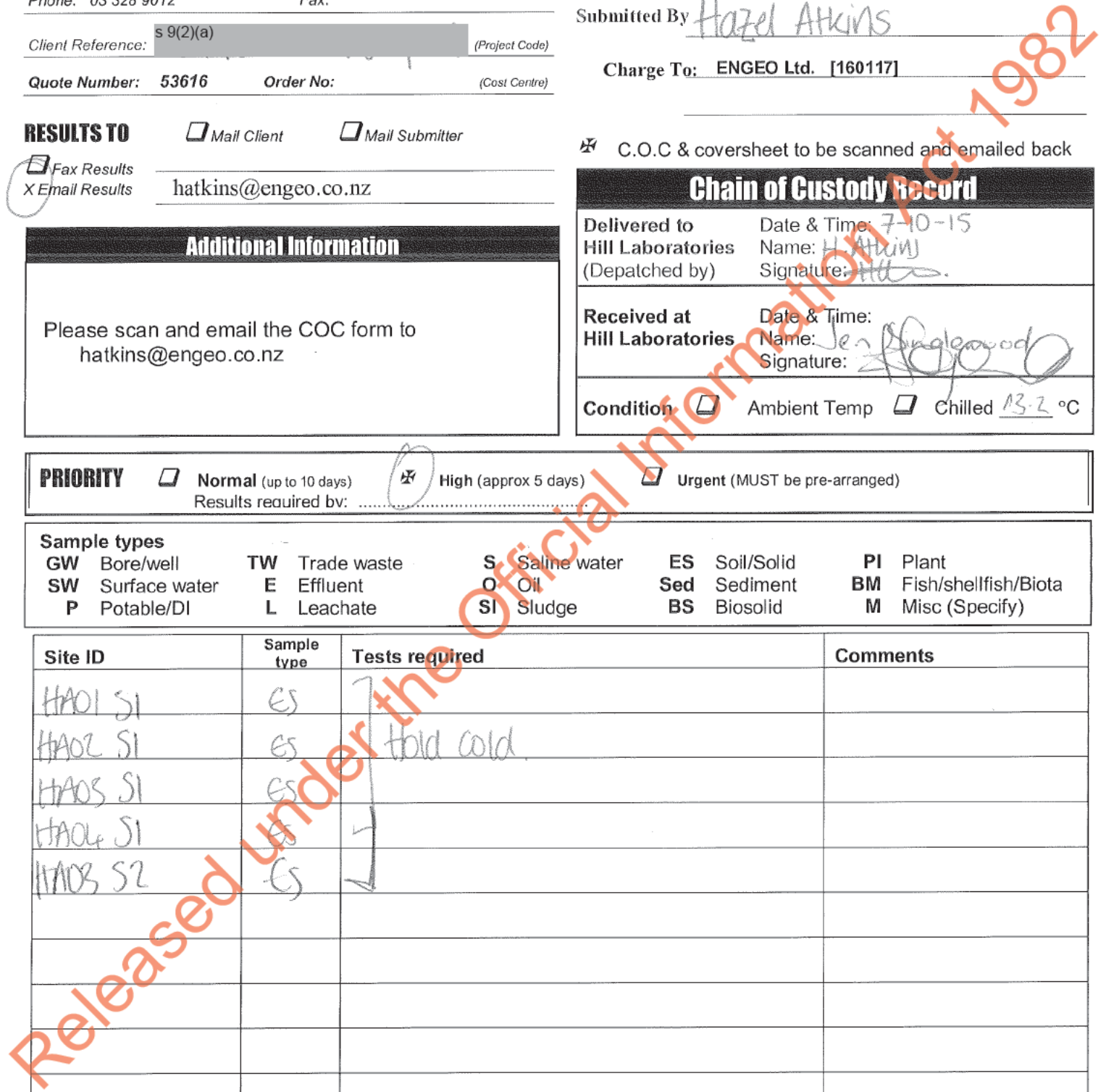
PRIORITY

Normal (up to 10 days) High (approx 5 days) Urgent (MUST be pre-arranged)
 Results required by:

Sample types

GW Bore/well TW Trade waste S Saline water ES Soil/Solid PI Plant
 SW Surface water E Effluent O Oil Sed Sediment BM Fish/shellfish/Biota
 P Potable/DI L Leachate SI Sludge BS Biosolid M Misc (Specify)

Site ID	Sample type	Tests required	Comments
HA01 S1	ES	↓ hold cold ↓	
HA02 S1	ES		
HA03 S1	ES		
HA04 S1	ES		
HA03 S2	ES		



Job No: 52040.010
24 September 2015

Fletchers EQR
PO Box 80 105
Riccarton
Christchurch 8440

Attention: James O' Brien

Dear James

Soil Contamination Investigation Report, s 9(2)(a)

1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by the Earthquake Commission (EQC) to undertake a review of potential for ground contamination and testing of soil quality at s 9(2)(a). The purpose of the review is to provide information for assessing ground contamination-related worker health and safety, resource consenting and confirming offsite disposal locations for earth soil generated during EQC's repair of the garage at the property. This report has been prepared for the sole use of Fletcher EQR (a division of The Fletcher Construction Company Ltd) and has been compiled and issued in accordance with the conditions outlined in our variation request to EQC dated 1 July 2014 and the associated terms of engagement.

Our preliminary assessment of consent requirements has been provided separately.

2 Background

Fletchers EQR are repairing the garage foundation at s 9(2)(a) that was damaged during the Canterbury Earthquake sequence. We understand the garage foundation is to be repaired by either mechanical jacking or the injection of low mobility grout. The works are expected to involve soil disturbance to a depth of up to 1.5 m below ground level (bgl). We understand that the repairs will involve less than 25 m³ of soil disturbance, with less than 5 m³ of surplus earth spoil removed offsite for disposal.

Environment Canterbury's (ECan) Listed Land Use Register (LLUR) for the property indicates that the site is located on the s 9(2)(a) Closed Landfill that operated from 1900 to the 1930s. According to ECan's records, no environmental investigations have previously been conducted on site.

3 Objective and scope of work

Given the past use of the site for landfilling activities, the scope of the investigation that was completed for the purposes of this report involved:

- Preliminary historical review involving a review of the ECan LLUR statement and historical aerial photographs currently held on the ECan GIS system;
- Site inspection and soil sampling at three locations within the areas of proposed soil disturbance;
- Collection of soil samples and scheduling of testing of these for key contaminants associated with landfilling activities to assess contaminant levels in soil to be disturbed and potentially disposed during the garage repairs; and
- Preparation and issue of this letter report.

The historical review, field investigations and reporting has been undertaken by a suitably qualified contaminated land specialist in accordance with the Resource Management National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES Soil) Regulations (2011) and the associated Users' Guide (2012).

4 Preliminary historical review

The ECan LLUR statement indicates that the subject site is within the much larger footprint of the Hawford Road Closed Landfill that was filled between 1900 to the 1930s. The LLUR statement includes investigation information from a number of properties within the former landfill footprint that indicates it contains traces of ceramic, glass, metal, brick, charcoal and other rubbish, up to approximately 2 m depth below the existing ground surface level (bgl).

The former landfill footprint is also recorded as an unidentified shallow landfill on a Christchurch City Council "s 9(2)(a) [REDACTED]".

A review of historical aerial photographs available on the ECan GIS confirms the site was undeveloped in the 1941 photograph (the earliest available). No evidence of landfilling was apparent in 1941, however this photograph was taken after the landfilling is thought to have occurred. The current dwelling and garage are visible on the site in the 1946 aerial photograph.

5 Field investigations

5.1 Soil sampling procedures

The field investigation was undertaken on 04 September 2015 following the preliminary historical review.

Soil sampling was undertaken by hand auguring at three locations (refer **Figure 1, Appendix A**). The hand auger boreholes were extended to a maximum depth of 1.0 m bgl.

Soil sampling was undertaken by the Contaminated Land Specialist according to the requirements of the NES Soil and the CLMG No. 5¹. All soil samples were collected according to the following procedure

- Soil samples were collected as discrete samples from the following depths: 0.1 m, 0.4 m, 1.0 m and 1.2 m bgl;
- The materials encountered were described in accordance with the NZ Geotechnical Society publication "Guidelines for the classification and field description of soils and rocks for engineering purposes";
- Freshly gloved hands were used to collect soil and the samples were placed immediately into the appropriate laboratory supplied sample containers;

¹ Ministry for the Environment, 2011: Contaminated Land Management Guideline No.5 – Site Investigation and Analysis of Soils.

- Equipment used to collect the samples was decontaminated between sample locations using clean water and Decon 90 (a phosphate-free detergent) rinses; and
- Samples were shipped in chilled container to IANZ-certified Hill Laboratories under chain of custody documentation.

5.2 Observations

The auger boreholes encountered the following soil profile:

- Topsoil with trace fine gravels, brown from 0 – 0.3 m bgl; overlying;
- Gravelly SAND fill, brownish black within inclusions of charcoal, brick, glass and concrete to the base of the investigation at 1.5 m bgl.

Orange and pink discolouration was noted in the soils from 0.3 - 0.8 m bgl at two sampling locations (HA 1 and HA 2). No asbestos containing materials (ACM) were observed.

6 Laboratory testing and acceptance criteria

Selected soil samples were tested for contaminants associated with landfilling activities (metals and polycyclic aromatic hydrocarbons) at IANZ-accredited Hills Laboratory. Given the presence of fill materials testing of soils for asbestos presence/ absence was also included.

A summary of the laboratory test results are provided in **Table 1** below with full laboratory transcripts attached in **Appendix A**.

The results in **Table 1** have been evaluated against the following criteria:

- NES Soil contaminant standards for a commercial land use with respect to protection of workers during the soil disturbance;
- Published background levels for the Canterbury area to assess potential for surplus soil to be disposed to cleanfill; and
- Burwood landfill acceptance criteria which are based on recreational land use criteria.

Table 1: Soil results – s 9(2)(a) (mg/kg)

Sample ID	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	BaP (eq) ¹	Asbestos
HA1 – 0.1	11	1.02	27	142	980	29	670	8.328	ND
HA1 – 0.4	65	10.2	77	800	<u>7,300</u>	92	10,700	25.481	Chrysotile, loose fibres
HA1 – 1.0	36	2.9	50	1,670	3,000	81	2,900	<u>87.2</u>	Chrysotile & Amosite, loose fibres
HA2 – 1.2	54	1.84	250	890	3,300	118	1,880	13.92	-
HA3 – 0.1	17	1.28	28	141	1,170	33	840	8.588	Chrysotile, debris
HA3 – 0.4	24	2.8	40	540	2,800	76	1,910	<u>75.09</u>	ND
HA3 – 1.0	-	-	-	-	-	-	-	-	ND
Average soil concentration	34.5	3.3	78.7	697.2	3,091.7	71.5	3,150	36.4	-
Expected Background ²	16.3	0.2	20.1	19.5	128.8	18	166.8	0.92 ³	-
Outdoor worker (unpaved) ⁴	70	1,300	6,300	NL	3,300	6,000 ⁵	400,000 ⁵	35	-

Sample ID	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	BaP (eq) ¹	Asbestos
Burwood Landfill ⁶	80	400	2,700	NL	880	600	14,000	40	-

Notes:

Bold indicates that published or expected natural background concentrations are exceeded;

Underline indicates that the outdoor worker (unpaved) criteria are exceeded;

Italics indicates that the Burwood Landfill acceptance criteria are exceeded;

ND – Non Detect;

¹ Only the calculated BaP equivalent shown in the table above. The soil samples were analysed for a full suite of polycyclic aromatic hydrocarbons;

² ECan GIS, Trace elements Level 2;

³ Background Concentrations of polycyclic aromatic hydrocarbons in Christchurch urban soils Report No. R07/19, July 2007;

⁴ MfE 2011, NES Users' Guide, Soil Contaminant Standards, Outdoor worker (unpaved);

⁵ ASC NEPM Toolbox – Update February 2014 - <http://www.scew.gov.au/node/941#hils>;

⁶ CCC, Burwood Landfill acceptance criteria.

7 Results findings

Evaluation of the laboratory results against the acceptance criteria indicates:

- All six soil samples contained cadmium, chromium, copper, lead, nickel and zinc that exceeded published background concentrations. Five of the six soil samples contained arsenic that exceeded published background concentrations;
- All six of the soil samples exceeded the published background concentrations for BaP (eq);
- The average soil concentration for BaP (eq) exceeded the published background concentration;
- Three out of the six samples exceeded the commercial land-use standards (to assess worker health and safety) for either lead and/or BaP (eq). Exceedances were in samples collected from 0.4 m depth bgl or deeper;
- All six soil samples exceeded the criteria for disposal to Burwood Landfill for lead. In addition two of the six samples tested for BaP (eq) exceeded the acceptance criteria for disposal to Burwood Landfill; and
- Three out of the six soil samples tested positive for the presence of asbestos, including one sample from surface.

8 Implications for repair works

The findings of the historical review and soil testing described in the previous section indicates:

- Fill material is present across the site which contains contaminant levels that exceed worker protection levels and Burwood managed fill criteria. It is suggested, therefore, that soil disturbance and soil disposal be kept to a minimum during the repair works. Where possible, the design and approach of the repair programme should be designed to reduce the associated soil disturbance;
- Excess soil from the site cannot be disposed of as cleanfill or managed fill (Burwood) due the presence of asbestos, metals and BaP (eq). Disposal to a licensed landfill (Kate Valley) will be required;
- Pre-treatment of surplus soils may be required prior to disposal to a licensed landfill to reduce the leachability of lead and BaP. This could involve the addition of lime to raise the pH of the soil. Further testing of the surplus excavated soils to determine the leachability, using the Toxicity Characteristic Leaching Potential (TCLP) methodology, will be required prior to disposal to determine whether pre-treatment is required. There may be sufficient soil sample

remaining from the soil testing undertaken to allow for this additional testing to be undertaken. Please confirm the volume and location of soil to be taken offsite and advise whether you wish us to organise this testing to be undertaken;

- Quantitative testing of asbestos content in soils is required to enable a risk based assessment in regards to worker health and safety. If asbestos is present at levels above the risk based acceptance criteria of 0.001%², the works would be notifiable to Worksafe and will be deemed restricted works as per the Asbestos Regulation (1998)³. We are available to undertake quantitative testing if you require, otherwise works will need to be undertaken as restricted works in the absence of this data;
- Assessment of residential land use is outside the scope of this report, however given the contaminant levels present the Sub-Contractor undertaking the works will need to ensure no exposed fill materials are left at surface on completion of the repair works. Further investigation would be required to assess risk to residents; and
- A site management plan will be required to inform the site Contractors on health and safety and material handling procedures and earthworks controls during the repair works. The works should not start onsite until the SMP has been made available and procedures put in place by the Contractor. We are available to create a site management plan if you require. The SMP will also set out procedures for managing any unexpected contamination, such as free phase oil or buried structures.

² Western Australian Department of Health, 2009: Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

³ Health and Safety in Employment Act 1992 and Health and Safety in Employment (Asbestos) Regulations 1998.

9 Applicability

This report has been commissioned by the Earthquake Commission for the sole benefit of Fletchers EQR with respect to the particular brief given to us and it may not be relied upon in any other contexts or for any other purpose without our prior review and written agreement.

All recommendations and opinions which are contained in this report are based on data from discrete soil samples. The nature and continuity of subsoil away from the investigation points are inferred but it must be appreciated that actual conditions could vary from the assumed model.

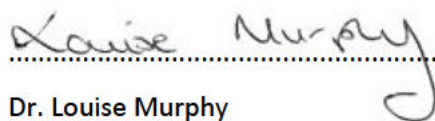
The Author of this report must be immediately contacted if any subsoil conditions are observed onsite which may vary from those which are described in this report.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:



Dr. Louise Murphy

Environmental Scientist



Tony Fairclough

Project Director

Report certified by a suitably qualified and experienced practitioner as prescribed under the NES Soil Users Guide (April 2012):



Wendi Williamson

Senior Contaminated Land Specialist

LUM

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Appendix A: Sampling information

- Figure 1
- Laboratory transcripts

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s 9(2)(a)



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Figure 1: Sampling locations at s 9(2)(a) . Image sourced from Google Earth Pro

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ANALYSIS REPORT

Client:	Tonkin & Taylor	Lab No:	1471932	SPv1
Contact:	Lucy Hine C/- Tonkin & Taylor PO Box 13055 CHRISTCHURCH 8141	Date Registered:	05-Sep-2015	
		Date Reported:	14-Sep-2015	
		Quote No:		
		Order No:		
		Client Reference:	52040.01 s 9(2)(a)	
		Submitted By:	Lucy Hine	

Sample Type: Soil

Sample Name:	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)
	.1m	- 0.4m	- 1.0m	- 1.2m	- 0.1m
	04-Sep-2015 4:00 pm	04-Sep-2015 4:00 pm	04-Sep-2015 4:00 pm	04-Sep-2015 4:00 pm	04-Sep-2015 4:00 pm
Lab Number:	1471932.1	1471932.2	1471932.3	1471932.6	1471932.7
Individual Tests					
Dry Matter	g/100g as rcvd	76	73	83	77
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn					
Total Recoverable Arsenic	mg/kg dry wt	11	65	36	54
Total Recoverable Cadmium	mg/kg dry wt	1.02	10.2	2.9	1.84
Total Recoverable Chromium	mg/kg dry wt	27	77	50	250
Total Recoverable Copper	mg/kg dry wt	142	800	1,670	890
Total Recoverable Lead	mg/kg dry wt	980	7,300	3,000	3,300
Total Recoverable Nickel	mg/kg dry wt	29	92	81	118
Total Recoverable Zinc	mg/kg dry wt	670	10,700	2,900	1,880
Asbestos in Soil					
As Received Weight	g	89.9	113.3	83.4	-
Dry Weight	g	68.8	83.8	69.7	-
<2mm Subsample Weight	g ashed wt	Entire Fraction	Entire Fraction	Entire Fraction	-
Asbestos Presence / Absence		Asbestos NOT detected.	Chrysotile (White Asbestos) detected.	Amosite (Brown Asbestos) and Chrysotile (White Asbestos) detected.	-
Description of Asbestos Form		-	Loose F bres	Loose F bres	-
Polycyclic Aromatic Hydrocarbons Screening in Soil					
Acenaphthene	mg/kg dry wt	0.06	0.20	0.31	0.05
Acenaphthylene	mg/kg dry wt	0.47	1.50	5.6	0.87
Anthracene	mg/kg dry wt	0.53	3.2	7.1	0.67
Benzo[a]anthracene	mg/kg dry wt	4.2	14.6	42	6.9
Benzo[a]pyrene (BAP)	mg/kg dry wt	5.7	16.3	53	8.8
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	6.1	19.7	59	9.1
Benzo[g,h,i]perylene	mg/kg dry wt	4.5	11.6	55	7.6
Benzo[k]fluoranthene	mg/kg dry wt	2.7	8.4	25	4.0
Chrysene	mg/kg dry wt	3.8	12.1	37	3.6
Dibenzo[a,h]anthracene	mg/kg dry wt	0.78	2.9	14.3	2.1
Fluoranthene	mg/kg dry wt	9.0	31	83	9.4
Fluorene	mg/kg dry wt	0.08	0.38	0.41	0.05
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	4.2	15.8	61	8.9
Naphthalene	mg/kg dry wt	0.15	0.41	0.95	0.22
Phenanthrene	mg/kg dry wt	2.9	13.3	28	1.41
Pyrene	mg/kg dry wt	9.1	30	83	12.0



Sample Type: Soil

Sample Name:		s 9(2)(a) - 0.4m 04-Sep-2015 4:00 pm	s 9(2)(a) - 1.0m 04-Sep-2015 4:00 pm			
Lab Number:		1471932.8	1471932.9			
Individual Tests						
Dry Matter	g/100g as rcvd	85	-	-	-	-
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	24	-	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	2.8	-	-	-	-
Total Recoverable Chromium	mg/kg dry wt	40	-	-	-	-
Total Recoverable Copper	mg/kg dry wt	540	-	-	-	-
Total Recoverable Lead	mg/kg dry wt	2,800	-	-	-	-
Total Recoverable Nickel	mg/kg dry wt	76	-	-	-	-
Total Recoverable Zinc	mg/kg dry wt	1,910	-	-	-	-
Asbestos in Soil						
As Received Weight	g	117.7	110.2	-	-	-
Dry Weight	g	98.5	81.8	-	-	-
<2mm Subsample Weight	g ashed wt	Entire Fraction	Entire Fraction	-	-	-
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	-	-	-
Description of Asbestos Form		-	-	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	0.81	-	-	-	-
Acenaphthylene	mg/kg dry wt	4.3	-	-	-	-
Anthracene	mg/kg dry wt	6.8	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	40	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	49	-	-	-	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	48	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	36	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	22	-	-	-	-
Chrysene	mg/kg dry wt	29	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	9.3	-	-	-	-
Fluoranthene	mg/kg dry wt	90	-	-	-	-
Fluorene	mg/kg dry wt	1.12	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	46	-	-	-	-
Naphthalene	mg/kg dry wt	1.08	-	-	-	-
Phenanthrene	mg/kg dry wt	42	-	-	-	-
Pyrene	mg/kg dry wt	86	-	-	-	-

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-3, 6-8
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-3, 6-8
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-3, 6-8
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	0.10 - 4 mg/kg dry wt	1-3, 6-8
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.010 - 0.05 mg/kg dry wt	1-3, 6-8
Asbestos in Soil			

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-3, 7-9
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	0.1 g	1-3, 7-9
<2mm Subsample Weight	Sample ashed at 400°C, weight of <2mm sample fraction taken for asbestos identification if less than entire fraction. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch.	-	1-3, 7-9
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 101c Waterloo Road, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1-3, 7-9
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-3, 7-9

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

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

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



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

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Job No: 52040.010
26 February 2016

Fletchers EQR
PO Box 80 105
Riccarton
Christchurch 8440

Attention: James O' Brien

Dear James

Additional Soil Contamination Investigation Report Drainage Repair Works

s 9(2)(a)

1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Earthquake Commission (EQC) to undertake an additional ground contamination investigation at s 9(2)(a) (the site, refer Figure 1, Appendix A). The purpose of the investigation is to provide information for assessing the quality of soil adjacent to the completed western section of the drainage repair works.

This report has been prepared for the sole use of Fletcher EQR (a division of The Fletcher Construction Company Ltd) and has been compiled and issued in accordance with the conditions outlined in our variation request to EQC dated 1 July 2014 and the associated terms of engagement.

2 Background

Drainage repair works comprised the excavation of drainage lines from the property down Coachman Lane to s 9(2)(a). The site is listed on Environment Canterbury's (ECan) Listed Land Use Register (LLUR) as forming part of the s 9(2)(a) Landfill.

The western portion of the drainage repair works were completed in November 2015 prior to soil contamination investigation works. A limited volume of soil from these works was taken to a subcontractor's yard for storage. The disposal location of the remaining excess soil is unknown.

Fletchers EQR instructed the drainage repair contractor to cease works. Fletcher EQR then requested T+T investigate the area of remaining works in the eastern portion of the site, and collect samples of the stockpile of material stored at the subcontractor's yard. T+T completed the investigation in December 2015¹.

The findings of the December investigation indicated that the soils to be disturbed and taken offsite as part of remaining area of repair works (eastern end of the driveway) contained low levels of contamination. The stockpile of material stored at the subcontractor's yard (reportedly from the

¹ T+T letter report, Soil Contamination Investigation Report, s 9(2)(a), dated 13 January 2016.

central area of drainage excavation) was found to comprise fill with waste materials and elevated concentrations of contaminants associated with landfilling; metals and polyaromatic hydrocarbons. No asbestos was detected in the samples tested.

In February 2016, Fletchers EQR requested T+T undertake further investigation works to assess the soil contaminant concentrations within the western part of the drainage works which were completed in November 2015. We understand Fletchers EQR require information to assess the implications of the drainage works completed in November 2015, particularly in terms of worker protection and possible environmental effects.

3 Scope of work

To assess contaminant levels in soil in the completed western area of drainage works, we undertook the following scope of works:

- A site walkover assessment and collection of soil samples by hand augering boreholes at four (4) locations beside the western drainage repair works alignment;
- Clearance of sampling locations for buried services prior to hand augering;
- Geological logging of soils to the targeted hand augered borehole depth of 1.2 m below ground level (bgl). The depth of sampling was determined by the invert of the completed drainage line;
- Reinstatement of the asphalt paving following the works; and
- Scheduling of laboratory testing based on observations made during the investigation and preparation of this letter report detailing the analytical results findings and implications related to the drainage works completed by the drainage works subcontractor.

4 Field investigations

Field investigations were undertaken on 12 February 2016. Samples were collected from four hand augered boreholes adjacent to the western drainage line at a spacing of approximately 6 m. The location of the hand augered boreholes (HA1 – HA4) and the location of the completed drainage area is shown in **Figure 1 (Appendix A)**.

The hand augered boreholes were extended to a maximum target depth of 1.2 m bgl (three of the four hand augers hit refusal before achieving target depth) and one to five samples collected in each hole (depending on borehole depth) to characterise soils encountered.

4.1 Soil sampling procedures

Soil sampling was undertaken according to the requirements of the NES Soil and the CLMG No. 5². Soil samples for chemical testing were collected according to the following procedure:

- Soil samples were taken as discrete samples regular intervals within the borehole;
- Freshly gloved hands were used to collect soil and the samples were placed immediately into the appropriate laboratory supplied sample containers;
- Equipment used to collect the samples was decontaminated between sample locations using clean water and Decon 90 (a phosphate-free detergent) rinses; and

² Ministry for the Environment, 2011: Contaminated Land Management Guideline No.5 – Site Investigation and Analysis of Soils.

- Samples were shipped in chilled container to IANZ-certified Hills Laboratories under chain of custody documentation.

Due to sampling restrictions, soil sampling for semi-quantitative analysis of asbestos was not able to be conducted in exact accordance with procedures outlined in the WA Guidelines³. The sampling procedure was as follows:

- Discrete 500 ml soil samples were collected with freshly gloved hands and transferred into laboratory provided jars. The discrete samples were sent to Precise for semi-quantitative testing;
- Sampling equipment used to collect the samples was decontaminated between sample locations using clean water and Decon 90 (a phosphate-free detergent) rinses; and
- Samples were shipped to IANZ-accredited Precise Consulting and Laboratory (Precise) under chain of custody documentation for semi-quantitative asbestos analysis.

Soils encountered were logged in accordance with the NZ Geotechnical Society publication "Guidelines for the classification and field description of soils and rocks for engineering purposes".

4.2 Observations

The following soil profile was recorded in the hand augered boreholes:

- HA1 – Fill comprising sand with some gravel to gravelly sand from surface to 0.6 m bgl and gravelly sand from 0.6 to 0.7 m bgl. Glass and ceramic fragments noted from 0.4 to 0.7 m bgl. Target depth of 1.2 m bgl was not achieved as refusal on gravels occurred at 0.7 m bgl;
- HA 2 – Fill comprising organic silt with minor sand from surface to 0.1 m bgl. Refusal occurred at 0.1 m bgl on dense gravels. No evidence of contamination or anthropogenic material was encountered;
- HA3 – Fill comprising organic silt with minor sand and trace gravels from surface to 0.3 m bgl, sand from 0.3 to 0.4 m bgl and silty sand with minor gravel 0.4 to 0.5 m bgl. Refusal on gravels occurred at 0.5 m bgl. No evidence of contamination or anthropogenic material was encountered; and
- HA4 – Fill comprising sand from surface to the target depth of 1.2 m bgl. No evidence of contamination or anthropogenic material was encountered.

No visual or olfactory evidence of contamination was noted, other than evidence of waste materials in HA1. No suspected asbestos containing materials (ACM) were observed in the boreholes.

5 Laboratory testing and acceptance criteria

Eight samples were selected for testing for contaminants associated with landfilling (metals and polycyclic aromatic hydrocarbons (PAHs)), and four samples tested for asbestos. A duplicate sample was tested for metals only.

A summary table of the laboratory test results is provided in **Appendix B** with full laboratory transcripts provided in **Appendix C**.

The results have been evaluated against the following criteria:

³ Western Australia (WA) Department of Health (DOH), 2009. "Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia".

- NES Soil contaminant standards (SCS) for outdoor worker (unpaved) land use with respect to protection of workers during the soil disturbance;
- WA acceptance criteria of 0.001% asbestos in soil on a weight for weight basis (w/w) that is applicable for all site uses. In respect of worker health and safety, in October 2014 Worksafe New Zealand⁴ stated disturbance of soils containing <0.001% asbestos would not be deemed *restricted work* under the Asbestos Regulations (1998)⁵;
- Published background levels for the Canterbury area to assess potential for soil to be disposed to cleanfill; and
- Burwood Landfill acceptance criteria (based on the NES Soil recreational land use criteria) applicable for soil disposal that does not meet cleanfill levels but for soils that do not contain asbestos.

5.1 Quality assurance/quality control

A duplicate sample was taken for quality assurance (QA) purposes and tested for metals. Overall, the duplicate pair showed good agreement for the contaminants tested; one analyte (arsenic) had a relative percentage difference (RPD) greater than 30%. The variation reflects the variability of the material observed (refer Section 4.2). The QA results are presented in **Table 1** below and should be considered in the assessment of the data set:

Table 1: QA/QC analysis – s 9(2)(a) (mg/kg)

Sample	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
HA3 0.1 m	23	0.22	17	26	126	12	184
HA3 0.1 m (duplicate)	12	0.17	17	30	114	14	158
RPD (%)	63	26	0	14	10	15	15

6 Results findings

Evaluation of the laboratory results against the acceptance criteria indicates:

- All samples from HA1 (the location in which waste materials were encountered) contained PAH and metal concentrations above published background levels. The concentrations of lead exceeded the outdoor worker (unpaved) SCS in one sample (from 0.6 m depth) and two samples (from 0.4 m and 0.6 m) exceeded the Burwood Landfill acceptance criteria. Semi-quantitative asbestos analysis detected asbestos fibres in samples from 0.1 m and 0.6 m bgl. This precludes the disposal of the material to Burwood Landfill. Asbestos concentration within both these samples exceeded the Worksafe New Zealand criterion (0.001% weight for weight asbestos content);
- In HA3 both sample depths contained PAH and metal concentrations above published background levels, however none exceeded the outdoor worker (unpaved) SCS or the Burwood Landfill criteria. Asbestos was not detected in the sample tested from this location; and
- In HA4 only the surface soil sample contained metal and PAH concentrations above published background levels. Deeper soil (0.4 m and below) contained contaminant concentrations below published background concentrations. The surface soil sample did not exceed outdoor

⁴ Position Statement – remediating asbestos contaminated sites – Worksafe New Zealand (October 2014, second edition).

⁵ Health and Safety in Employment Act 1992 and Health and Safety in Employment (Asbestos) Regulations 1998.

worker (unpaved) land use SCS or the Burwood Landfill criteria. Asbestos was not detected in the sample tested from this location.

7 Implications for completed repair works

The findings of the soil testing described in the previous section indicates:

- Fill material is present adjacent to the completed drainage section and although variable laterally and vertically is likely to be relatively representative of materials excavated from the trench during the drainage works. From the investigation undertaken it appears that the historic filling at the site was variable, with a pocket of gravelly fill with waste materials encountered at surface in the centre of the drainage works line (around HA1). The shallow soils disturbed by the drainage excavation works to the western and eastern⁶, side of this area appear to comprise sand and silt fill;
- The gravelly fill with waste in HA1 contains contaminant levels that exceed worker protection levels (lead and asbestos) and exceed the acceptance criteria for disposal to Burwood Landfill. Surplus soil of this type that required offsite disposal would have to have been to a suitably licensed facility (Kate Valley is currently the only licensed landfill in the Canterbury region that accepts asbestos-contaminated materials);
- The sand and silt fill encountered in the western and eastern areas of the completed drainage section contained low levels of contaminants, generally restricted to surface soils;
- As asbestos concentrations within HA1 exceeded the Worksafe New Zealand criterion, the repair works in that area would have required controls commensurate with *restricted works* as set out in the Asbestos regulations (1998) and observed by a person holding a certificate of competence (CoC) under the regulation; and
- Had testing prior to completion of the works been undertaken and the results similar to those above been found, a Site Management Plan (SMP) for ground contamination would have been required to set out procedures carrying out the works. In the absence of an SMP, as a minimum FEQR's internal set of health and safety procedures for working on HAIL sites would be required to have been followed during the course of the works.

⁶ Refer to T+T letter report dated 13 January 2016 for results.

8 Applicability

This report has been commissioned by our client, Earthquake Commission for the sole benefit of Fletchers EQR, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

All recommendations and opinions which are contained in this report are based on data from discrete soil samples. The nature and continuity of subsoil away from the investigation points are inferred but it must be appreciated that actual conditions could vary from the assumed model.

The Author of this report must be immediately contacted if any subsoil conditions are observed onsite which may vary from those which are described in this report.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:



Ali Anwar

Environmental Scientist



Peter Cochrane

Project Director

Report certified by a suitably qualified and experienced practitioner as prescribed under the NES Soil Users Guide (April 2012):



Wendi Williamson

Senior Contaminated Land Specialist

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Appendix A: Figure

- Figure 1

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s 9(2)(a)



R

Source: Google Earth Pro. © 2015 Google (Imagery date 26/4/2012)



DRAWN	AA	Feb16
DRAFTING CHECKED	SIK	Feb16
APPROVED	Rc	21/16
FILE	2016.02.22 Figure 1	
APPROX. SCALE (AT A4 SIZE) AS SHOWN		
PROJECT No.	52040.01	



FLETCHERS EQR
SOIL CONTAMINATION INVESTIGATION REPORT
 (a) (2) (a)

Sample Locations

FIG. No. Figure 1

Appendix B: Results table

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Appendix B: Soil Analytical Results - s 9(2)(a)

Analytes	Units	Sample IDs									Mean PAH Concentrations	Guidelines		
		s 9(2)(a)										Background ²	Outdoor worker (unpaved) ⁴	Burwood ⁶
Heavy Metals														
Total Recoverable Arsenic	mg/kg	9	16	50	23	13	10	5	-	4	-	16.3	70	80
Total Recoverable Cadmium	mg/kg	0.39	0.81	2.5	0.22	0.24	0.25	< 0.10	-	< 0.10	-	0.2	1,300	400
Total Recoverable Chromium	mg/kg	26	29	54	17	16	17	13	-	13	-	20.1	6,300	2,700
Total Recoverable Copper	mg/kg	96	340	1,590	26	71	35	11	-	6	-	19.5	NL	NL
Total Recoverable Lead	mg/kg	460	1,480	4,200	126	260	210	69	-	15.8	-	128.8	3,300	880
Total Recoverable Nickel	mg/kg	27	47	110	12	13	20	12	-	11	-	18	6,000 ⁵	600
Total Recoverable Zinc	mg/kg	780	920	3,300	184	210	220	101	-	46	-	166.8	400,000 ⁵	14,000
Polycyclic Aromatic Hydrocarbons														
Acenaphthene	mg/kg	0.26	0.3	0.14	< 0.03	< 0.03	0.3	< 0.03	-	< 0.03	0.1	0.055 ³	-	-
Acenaphthylene	mg/kg	0.83	1.9	0.74	0.06	0.13	1.9	< 0.03	-	< 0.03	0.7	0.069 ³	-	-
Anthracene	mg/kg	1.3	2.9	1	0.07	0.12	3.9	< 0.03	-	< 0.03	1.2	0.113 ³	-	-
Benzo[a]anthracene	mg/kg	6.9	15.7	6.2	0.3	0.73	10	0.05	-	0.06	5	0.47 ³	-	-
Benzo[a]pyrene (BAP)	mg/kg	9.5	20	8.6	0.51	1.26	10.1	0.09	-	0.09	6.3	0.595 ³	-	40
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg	9.9	22	9.9	0.52	1.3	10.4	0.09	-	0.07	6.8	0.947 ³	-	-
Benzo[g,h,i]perylene	mg/kg	6.5	12.1	5.6	0.38	0.84	4.9	0.07	-	0.0	3.8	0.459 ³	-	-
Benzo[k]fluoranthene	mg/kg	4.1	8.6	3.8	0.21	0.53	4	0.04	-	0.03	2.7	0.296 ³	-	-
Chrysene	mg/kg	6.8	14	6.1	0.41	0.84	9.4	0.06	-	0.05	4.7	0.539 ³	-	-
Dibenzo[a,h]anthracene	mg/kg	1.1	2.1	1	0.08	0.18	1.1	0.02	-	0.03	0.7	0.112 ³	-	-
Fluoranthene	mg/kg	17	38	14.5	0.81	1.68	29	0.11	-	0.06	12.6	1.345 ³	-	-
Fluorene	mg/kg	0.29	0.4	0.19	< 0.03	< 0.03	0.9	< 0.03	-	< 0.03	0.2	0.06 ³	-	-
Indeno[1,2,3-c,d]pyrene	mg/kg	6.3	13.2	5.9	0.41	1.04	5.7	0.07	-	0.04	4.1	0.385 ³	-	-
Naphthalene	mg/kg	0.26	< 1.3	0.26	< 0.14	< 0.13	1.3	< 0.12	-	< 0.12	0.3	0.029 ³	190 ⁷	-
Phenanthrene	mg/kg	6.5	14.4	4.9	0.34	0.47	28	0.04	-	< 0.03	6.8	0.703 ³	-	-
Pyrene	mg/kg	15.9	32	13.3	0.87	1.69	26	0.12	-	0.07	11.2	1.362 ³	NL ⁷	-
BaP eq ¹	mg/kg	13.56	28.57	12.39	0.75	1.83	14.59	0.14	-	0.14	9.0	0.92 ³	35 ⁷	40
Semi-quantitative Asbestos														
< 2 mm fraction	%	0.0008	-	0.0006	ND	-	-	-	ND	-	-	ND	-	ND
< 2 mm + 2-7 mm fractions	%	0.0011	-	0.0009	ND	-	-	-	ND	-	-	ND	-	ND
Sum of < 7mm fractions	%	0.0019	-	0.0015	ND	-	-	-	ND	-	-	ND	0.001 ⁸	ND

Notes:

Bold indicates that published or expected natural background concentrations are exceeded. Background metal concentrations are compared to individual results, while background PAH concentrations are compared to an average.

Underline indicates that the outdoor worker (unpaved) criteria are exceeded.

Italics indicates that the Burwood Landfill acceptance criteria are exceeded.

NL - Non Limiting.

ND - Non Detect.

1 BaP equivalent concentrations are calculated by taking into account the nine carcinogenic PAHs.

2 ECan GIS, Trace elements Level 2.

3 Background Concentrations of polycyclic aromatic hydrocarbons in Christchurch urban soils Report No. R07/19, July 2007.

4 MFE 2011, NES Users Guide, Soil Contaminant Standards, Outdoor worker (unpaved).

5 ASC NEPM Toolbox - Update February 2014 - <http://www.scew.govt.nz/node/941#hils>.

6 CCC, Burwood Landfill acceptance criteria.

7 MFE, Guidelines for assessing and managing petroleum hydrocarbon contaminated sites in New Zealand, all pathways, commercial/industrial, sand < 1 m. Aug 1999.

8 Department of Health, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia. May 2009.

Appendix C: Laboratory transcripts

- Hill Laboratories – 1537275
- Precise Consulting & Laboratory – J110534
- Precise Consulting & Laboratory – J110670

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ANALYSIS REPORT

Client:	Tonkin & Taylor	Lab No:	1537275	SPv1
Contact:	Lucy Hine C/- Tonkin & Taylor PO Box 13055 Christchurch 8141	Date Registered:	13-Feb-2016	
		Date Reported:	19-Feb-2016	
		Quote No:		
		Order No:		
		Client Reference:	52040.01 s 9(2)(a)	
		Submitted By:	Lucy Hine	

Sample Type: Soil

Sample Name:	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)
	0.1m 12-Feb-2016 12:00 pm	0.4m 12-Feb-2016 12:10 pm	0.6m 12-Feb-2016 12:20 pm	0.1m 12-Feb-2016	0.1m Duplicate 12-Feb-2016 12:30 pm
Lab Number:	1537275.1	1537275.2	1537275.3	1537275.5	1537275.6

Individual Tests						
Dry Matter	g/100g as rcvd	94	91	89	79	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	9	16	50	23	12
Total Recoverable Cadmium	mg/kg dry wt	0.39	0.81	2.5	0.22	0.17
Total Recoverable Chromium	mg/kg dry wt	26	29	54	17	17
Total Recoverable Copper	mg/kg dry wt	96	340	1,590	26	30
Total Recoverable Lead	mg/kg dry wt	460	1,480	4,200	126	114
Total Recoverable Nickel	mg/kg dry wt	27	47	110	12	14
Total Recoverable Zinc	mg/kg dry wt	780	920	3,300	184	158
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	0.26	0.3	0.14	< 0.03	-
Acenaphthylene	mg/kg dry wt	0.83	1.9	0.74	0.06	-
Anthracene	mg/kg dry wt	1.3	2.9	1.0	0.07	-
Benzo[a]anthracene	mg/kg dry wt	6.9	15.7	6.2	0.30	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	9.5	20	8.6	0.51	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	9.9	22	9.9	0.52	-
Benzo[g,h,i]perylene	mg/kg dry wt	6.5	12.1	5.6	0.38	-
Benzo[k]fluoranthene	mg/kg dry wt	4.1	8.6	3.8	0.21	-
Chrysene	mg/kg dry wt	6.8	14.0	6.1	0.41	-
Dibenzo[a,h]anthracene	mg/kg dry wt	1.1	2.1	1.0	0.08	-
Fluoranthene	mg/kg dry wt	17.0	38	14.5	0.81	-
Fluorene	mg/kg dry wt	0.29	0.4	0.19	< 0.03	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	6.3	13.2	5.9	0.41	-
Naphthalene	mg/kg dry wt	0.26	< 1.3	0.26	< 0.14	-
Phenanthrene	mg/kg dry wt	6.5	14.4	4.9	0.34	-
Pyrene	mg/kg dry wt	15.9	32	13.3	0.87	-

Sample Name:	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)
	0.4m 12-Feb-2016	0.1m 12-Feb-2016 11:15 am	0.4m 12-Feb-2016 11:20 am	0.8m 12-Feb-2016 11:30 am
Lab Number:	1537275.7	1537275.8	1537275.9	1537275.10

Individual Tests						
Dry Matter	g/100g as rcvd	84	92	93	97	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	13	10	5	4	-



Sample Type: Soil

Sample Name:		s 9(2)(a)	s 9(2)(a)	s 9(2)(a)	s 9(2)(a)	
		0.4m 12-Feb-2016	0.1m 12-Feb-2016 11:15 am	0.4m 12-Feb-2016 11:20 am	0.8m 12-Feb-2016 11:30 am	
Lab Number:		1537275.7	1537275.8	1537275.9	1537275.10	
Heavy Metals, Screen Level						
Total Recoverable Cadmium	mg/kg dry wt	0.24	0.25	< 0.10	< 0.10	-
Total Recoverable Chromium	mg/kg dry wt	16	17	13	13	-
Total Recoverable Copper	mg/kg dry wt	71	35	11	6	-
Total Recoverable Lead	mg/kg dry wt	260	210	69	15.8	-
Total Recoverable Nickel	mg/kg dry wt	13	20	12	11	-
Total Recoverable Zinc	mg/kg dry wt	210	220	101	46	-
Polycyclic Aromatic Hydrocarbons Screening in Soil						
Acenaphthene	mg/kg dry wt	< 0.03	0.3	< 0.03	< 0.03	-
Acenaphthylene	mg/kg dry wt	0.13	1.9	< 0.03	< 0.03	-
Anthracene	mg/kg dry wt	0.12	3.9	< 0.03	< 0.03	-
Benzo[a]anthracene	mg/kg dry wt	0.73	10.0	0.05	0.06	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	1.26	10.1	0.09	0.09	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	1.30	10.4	0.09	0.07	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.84	4.9	0.07	0.05	-
Benzo[k]fluoranthene	mg/kg dry wt	0.53	4.0	0.04	0.03	-
Chrysene	mg/kg dry wt	0.84	9.4	0.06	0.05	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.18	1.1	0.02	0.03	-
Fluoranthene	mg/kg dry wt	1.68	29	0.11	0.06	-
Fluorene	mg/kg dry wt	< 0.03	0.9	< 0.03	< 0.03	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	1.04	5.7	0.07	0.04	-
Naphthalene	mg/kg dry wt	< 0.13	1.3	< 0.12	< 0.12	-
Phenanthrene	mg/kg dry wt	0.47	28	0.04	< 0.03	-
Pyrene	mg/kg dry wt	1.69	26	0.12	0.07	-

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Heavy Metals, Screen Level	Dried sample < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-3, 5-10
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, Dilution or SPE cleanup (if required), GC-MS SIM analysis (modified US EPA 8270). Tested on as received sample. [KBIs:5786,2805,2695]	0.010 - 0.05 mg/kg dry wt	1-3, 5, 7-10
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550. (Free water removed before analysis).	0.10 g/100g as rcvd	1-3, 5, 7-10

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

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

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

DATE: 16th February 2016

JOB NUMBER: J110534 (1)



PRECISE

CONSULTING & LABORATORY

Tonkin and Taylor (Christchurch)

33 Parkhouse Road
Wigram
Christchurch
8042

Client Reference: 52040.01 s 9(2)(a)

Dear Mark Morley,

Re: Asbestos Identification Analysis – s 9(2)(a)

Four (4) samples received on 15th February 2016 by Alex Julius.

The results of fibre analysis were performed by Adam Maurice of Precise Consulting and Laboratory Ltd on 15th February 2016.

The sample(s) were stated to be from s 9(2)(a)

Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with the guidelines of *AS4964-2004 Method for the qualitative identification of asbestos in bulk samples*.

The results of the fibre analysis are presented in the appended table.

Should you require further information please contact Adam Maurice.

Yours sincerely

Adam Maurice
PRECISE LABORATORY IDENTIFIER



PRECISE

CONSULTING & LABORATORY

Sample Analysis Results

Job No: J110534

16 February 2016

Note 1: The reporting limit for this analysis is 0.1g/kg (0.01%) by application of polarised light microscopy, dispersion staining and trace analysis techniques.

Note 2: If mineral fibres of unknown type are detected (UMF), by PLM and dispersion staining, these may or may not be asbestos fibres. To confirm the identity of this fibre, another independent analytical technique such as XRD analysis is advised.

Note 3: The samples in this report are "As Received" the laboratory does not take responsibility for the sampling procedure or accuracy of sample location description.

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Identified by:

Adam Maurice
Approved Identifier

Reviewed by:

Adam Maurice
Key Technical Person

Site Address: s 9(2)(a)			
Sample ID	Client Sample Number	Sample Location/Description/Dimensions	Analysis Results
BS041871	HA1- s 9(2)(a) 0.1m	Qualitative Asbestos Non-Homogeneous Soil 364.95g	Chrysotile (White Asbestos) Organic Fibre Type
BS041872	HA1- s 9(2)(a) 0.6m	Qualitative Asbestos Non-Homogeneous Soil 363.48g	Chrysotile (White Asbestos) Organic Fibre Type

Sample Analysis Results



PRECISE

CONSULTING & LABORATORY

Job No: J110534

16 February 2016

Site Address: s 9(2)(a)			
Sample ID	Client Sample Number	Sample Location/Description/Dimensions	Analysis Results
BS041874	HA3- s 9(2)(a) 0.1m	Qualitative Asbestos Non-Homogeneous Soil 360.43g	No Asbestos Detected Organic Fibre Type
BS041876	HA4- s 9(2)(a) 0.6m	Qualitative Asbestos Non-Homogeneous Soil 395.94g	No Asbestos Detected Organic Fibre Type



PRECISE

CONSULTING & LABORATORY

Appendix 1: Soil Analysis Raw Data

Job No: J110534

Tuesday, 16 February 2016

Sample ID	Client Sample Number	Total Sample Weight (g)	ACM Approximate Dimensions*	Form	Trace Asbestos Detected (Y/N) [†]
BS051871	HA1- s 9(2)(a) 0.1111	364.95	<0.006	Free Fibres	No
BS051872	HA1- s 9(2)(a) 0.0111	363.48	<0.006	Free Fibres	No
BS051874	HA3- s 9(2)(a) 0.1111	360.43	No Asbestos Detected	-	No
BS051876	HA4- s 9(2)(a) 0.0111	395.94	No Asbestos Detected		No

* The reporting limit for this standard is 0.1g/kg

[†] Trace asbestos present is indicative that freely liberated respirable fibres are present and dust control measures should be implemented or increased

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DATE: 19th February 2016

JOB NUMBER: J110670 (1)



PRECISE

CONSULTING & LABORATORY

Tonkin and Taylor (Christchurch)

33 Parkhouse Road
Wigram
Christchurch
8042

Client Reference: 52040.01 s 9(2)(a)

Dear Mark Morley,

Re: Asbestos Identification Analysis – s 9(2)(a)

Two (2) samples received on 18th February 2016 by Adam Maurice.

The results of fibre analysis were performed by Adam Maurice of Precise Consulting and Laboratory Ltd on 19th February 2016.

The sample(s) were stated to be from s 9(2)(a)

Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with the guidelines of *AS4964-2004 Method for the qualitative identification of asbestos in bulk samples*.

The results of the fibre analysis are presented in the appended table.

Should you require further information please contact Adam Maurice.

Yours sincerely

Adam Maurice
PRECISE LABORATORY IDENTIFIER



PRECISE

CONSULTING & LABORATORY

Sample Analysis Results

Job No: J110670

19 February 2016

Note 1: The reporting limit for this analysis is 0.1g/kg (0.01%) by application of polarised light microscopy, dispersion staining and trace analysis techniques.

Note 2: If mineral fibres of unknown type are detected (UMF), by PLM and dispersion staining, these may or may not be asbestos fibres. To confirm the identity of this fibre, another independent analytical technique such as XRD analysis is advised.

Note 3: The samples in this report are "As Received" the laboratory does not take responsibility for the sampling procedure or accuracy of sample location description.

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Identified by:

Adam Maurice
Approved Identifier

Reviewed by:

Adam Maurice
Key Technical Person

Site Address s 9(2)(a)			
Sample ID	Client Sample Number	Sample Location/Description/Dimensions	Analysis Results
BS042187	HA1- s 9(2)(a) 0.1m	Quantitative Asbestos Non-Homogeneous Soil 364.95g	Chrysotile (White Asbestos) Organic Fibre Type
BS042188	HA1- s 9(2)(a) 0.6m	Quantitative Asbestos Non-Homogeneous Soil 363.48g	Chrysotile (White Asbestos) Organic Fibre Type



PRECISE

CONSULTING & LABORATORY

Appendix 1: Soil Analysis Raw Data

Job No: J110670

Friday, 19th February 2016

Sample ID	Client Sample Number	Sample Weights						>7mm Asbestos Containing Material (ACM) ¹		Asbestos Fines/Fibrous Asbestos ¹				Trace Asbestos Detected (Y/N) ²
		Total 10L (Kg)	Total 500mL Sub-Sample (g)	>7mm Fraction (g)	2-7mm Fraction (g)	<2mm Sub Sample (g)	<2mm Excess (g)	>7mm ACM (g)	Form & % ³	2-7mm ACM (g)	Form & % ³	<2mm ACM (g)	Form & % ³	
BS042187	s 9(2)(a) U.1m	-	364.95	39.74	33.85	101.52	189.84	No Asbestos Detected	-	<0.001	Free Fibres 100%	<0.001	Free Fibres 100%	No
BS042188	s 9(2)(a) U.6m	-	363.48	46.36	80.39	105.56	131.17	No Asbestos Detected	-	<0.001	Free Fibres 100%	<0.001	Free Fibres 100%	No

¹ These results are raw weighed data presented as per the Western Australian Guidelines and may be under the reporting limit for guidelines AS4964 of 0.1g/kg

² Trace asbestos detected is indicative that freely liberated respirable fibres are present and dust control measures should be implemented or increased on site. This is not the sole indicator for the friable nature of the asbestos present.

³ Asbestos percentage is determined using EPA-600-R-93-116: Method for the Determination of Asbestos in Bulk Building Materials and are outside of IANZ accreditation #1097 and is therefore not endorsed by IANZ

5 April 2016

s 9(2)(a)

s 9(2)(a)

Attention: s 9(2)(a)

Dear s 9(2)(a)

Land at s 9(2)(a) is registered on the LLUR due to known historical landfill in the area. It is proposed to remove approx. 100mm of buried topsoil (10 m³) of soil from under the existing driveway near the garage.

The soil to be removed was sampled in three test pits between 0-400mm bgl and analysed as composite. Concentrations of contaminants of concern are summarised in Table 1. The laboratory report is appended.

Table 1. Analytical results, NES standards for residential land use, ANZECC interim sediment quality guidelines (ISQG high) and natural background (Level 2).

	NES SCS ¹ residential	ANZECC ISQG high	Trace Elements (L2) RECENT soil Christchurch urban	Burwood Landfill acceptance criteria	TP1,TP2,TP3 (composite of soil to be removed from under driveway)
Arsenic	20	70	16.3	80	13
Cadmium	3	10	0.2	400	< 0.4
Chromium ²	460	370	20.1	2,700	13
Copper	NL	270	19.5	NL	29
Lead	210	220	128.8	880	990
Mercury	310	1	0.1	1,800	< 0.1
Nickel	400	52	18	n/a	13
Zinc	7,400	410	166.8	n/a	330

Discussion and disposal options

The lead concentration in the soil to be removed is slightly above the Burwood Landfill acceptance criterion of 880mg/kg soil. All other analysed contaminants of concern are at or below natural background, or slightly elevated (copper, zinc), but below NES soil contaminant standards for residential land use.


The Burwood Landfill acceptance criteria can be achieved by diluting the lead concentrations 1:5; e.g. by adding 2m³ of clean soil to the slightly contaminated 10m³ removed from the site.

¹ Nickel and zinc from Australian ASC NEPM Schedule B1 (no SCS available)

² Total chromium is assumed to be hexavalent (Cr VI) as a conservative approach

I hope that this is of assistance. If I have left any aspect that you wanted clarified unclear or unanswered, do let me know and I will do my best to remedy that.

Yours sincerely
ELIOT SINCLAIR & PARTNERS LTD


Jens Zollhofer

PhD, MSc, PGCertRS, CEnvP
Jens.Zollhofer@eliot-sinclair.co.nz
JMZ:jmz

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Search

s 9(2)(a) Christchurch City

s 9(2)(a)

Property Search Results

Legal Description	Titles	Valuation No
s 9(2)(a)		
	s 9(2)(a)	

Overview Finding your address Search summary

Thank you for your enquiry. The Listed Land Use Register has information relating to this land parcel. If you would like a property statement and / or a site management plan, please fill in your details below.

Records Found

HAIL Activities

No.	HAIL Type
ACT 99492	G3 - Landfill sites

Sites

No.	Site Category	Site Name
s 9(2)(a)	Not Investigated	s 9(2)(a)
s 9(2)(a)	Review In Progress	s 9(2)(a) Christchurch

Investigations

No.	Type	Investigation Title	Report Date
s 9(2)	DSI	Additional Soil Contamination Investigation Report - Drainage Repair Works - s 9(2)(a)	Feb 26, 2016
s 9(2) ()	DSI	Soil Contamination Investigation Report: s 9(2)(a)	Jan 13, 2016

Figure 1: LLUR record s 9(2)(a)



Figure 2: Test Pit 1



Figure 3: Test Pit 2



Figure 4: Test Pit 2



Figure 5: Test Pit 3

Released



Eliot Sinclair Partners Ltd
 P O BOX 9339 Tower Junction
 Christchurch
 New Zealand 8149

Eliot Sinclair Partners Ltd
 P O BOX 9339 Tower Junction
 Christchurch
 New Zealand 8149

Attention: Jens Zollhofer

Attention: Jens Zollhofer

Report 494357-S
 Project name s 9(2)(a)
 Received Date Mar 24, 2016

Report 494357-S
 Project name s 9(2)(a)
 Received Date Mar 24, 2016

Client Sample ID		
Sample Matrix		
Eurofins mgt Sample No.		
Date Sampled		
Test/Reference	LOR	Unit
Metals M8 (NZ MfE)		
Arsenic	2	mg/kg
Cadmium	0.4	mg/kg
Chromium	5	mg/kg
Copper	5	mg/kg
Lead	5	mg/kg
Mercury	0.1	mg/kg
Nickel	5	mg/kg
Zinc	5	mg/kg
<hr/>		
% Moisture	1	%

Client Sample ID		
Sample Matrix		
Eurofins mgt Sample No.		
Date Sampled		
Test/Reference	LOR	Unit
Metals M8 (NZ MfE)		
Arsenic	2	mg/kg
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<hr/>		
% Moisture	1	%

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Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is
A recent review of our LIMS has resulted in the correction or clarification of some method identification
no substantive change has been made to our laboratory methods, and as such there is no change in
If the date and time of sampling are not provided, the Laboratory will not be responsible for comprom

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Description

Metals M8 (NZ MFE)

- Method: USEPA 6010/6020 Heavy Metals

% Moisture

- Method: LTM-GEN-7080 Moisture

Description

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% Moisture

- Method: LTM-GEN-7080 Moisture

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Company Name: Eliot Sinclair Partners Ltd		Order No.:	
Address: P O BOX 8339 Tower Junction Christchurch New Zealand 8149		Report #:	
Project Name: s 9(2)(a)		Phone #:	
		Fax:	
Sample Detail			
Asbestos Absence / Presence			
HOLD			
Moisture Sat			
Metals (M) (NZ/ME)			
Laboratory where analysis is conducted			
Melbourne Laboratory - NATA Site # 1254 & 14271			
Sydney Laboratory - NATA Site # 18217			
Brisbane Laboratory - NATA Site # 20794			
External Laboratory			
Sample ID	Sample Date	Sampling Time	LAB ID
COMPOSITE	Mar 20, 2016		M16-Ma25099
DRIVEWAY WEST	Mar 20, 2016		M16-Ma25100
DRIVEWAY EAST	Mar 20, 2016		M16-Ma25101
3-POINT TURN	Mar 20, 2016		M16-Ma25102

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Sam request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are dilute
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted other
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previ

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 t Receipt Advice.
 If the Laboratory did not receive the information in the required timeframe, and regardless of any other Holding times apply from the date of sampling, therefore compliance to these may be outside the labor
****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per Kilogram	mg/
ug/l: micrograms per litre	ppb
ppb: Parts per billion	%: f
org/100ml: Organisms per 100 millilitres	NTL
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 ex
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recove
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 c 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 per
Duplicate	A second piece of analysis from the same sample and reported in the sa
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of t
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (Eurofins mgt uses NATA acc
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this rep
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance
 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 20-130%.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either 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 ou and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not a
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the S
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commerci 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 minut Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the de
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 no
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data

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9. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was nr
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Quality Control Results

Test				Units
Method Blank				
Metals M8 (NZ MFE)				
Arsenic				mg/kg
Cadmium				mg/kg
Chromium				mg/kg
Copper				mg/kg
Lead				mg/kg
Mercury				mg/kg
Nickel				mg/kg
Zinc				mg/kg
LCS - % Recovery				
Metals M8 (NZ MFE)				
Arsenic				%
Cadmium				%
Chromium				%
Copper				%
Lead				%
Nickel				%
Zinc				%
Test	Lab Sample ID	QA Source		Units
Spike - % Recovery				
Metals M8 (NZ MFE)				
Arsenic	M16-Ma25099	CP		%
Cadmium	M16-Ma25099	CP		%
Chromium	M16-Ma25099	CP		%
Copper	M16-Ma25099	CP		%
Lead	M16-Ma26555	NCP		%
Mercury	M16-Ma25371	NCP		%
Nickel	M16-Ma25099	CP		%
Zinc	M16-Ma26555	NCP		%
Test	Lab Sample ID	QA Source		Units
Duplicate				
Metals M8 (NZ MFE)				
Arsenic	M16-Ma25099	CP		mg/kg
Cadmium	M16-Ma25099	CP		mg/kg
Chromium	M16-Ma25099	CP		mg/kg
Copper	M16-Ma25099	CP		mg/kg
Lead	M16-Ma25099	CP		mg/kg
Mercury	M16-Ma25371	NCP		mg/kg
Nickel	M16-Ma25099	CP		mg/kg
Zinc	M16-Ma25099	CP		mg/kg
Duplicate				
% Moisture	M16-Ma25205	NCP		%

Quality Control Results

Test				Units
Method Blank				
Metals M8 (NZ MFE)				
Arsenic				mg/kg
Cadmium				mg/kg
Chromium				mg/kg
Copper				mg/kg
Lead				mg/kg
Mercury				mg/kg
Nickel				mg/kg
Zinc				mg/kg
LCS - % Recovery				
Metals M8 (NZ MFE)				
Arsenic				%
Cadmium				%
Chromium				%
Copper				%
Lead				%
Nickel				%
Zinc				%
Test	Lab Sample ID	QA Source		Units
Spike - % Recovery				
Metals M8 (NZ MFE)				
Arsenic	M16-Ma25099	CP		%
Cadmium	M16-Ma25099	CP		%
Chromium	M16-Ma25099	CP		%
Copper	M16-Ma25099	CP		%
Lead	M16-Ma26555	NCP		%
Mercury	M16-Ma25371	NCP		%
Nickel	M16-Ma25099	CP		%
Zinc	M16-Ma26555	NCP		%
Test	Lab Sample ID	QA Source		Units
Duplicate				
Metals M8 (NZ MFE)				
Arsenic	M16-Ma25099	CP		mg/kg
Cadmium	M16-Ma25099	CP		mg/kg
Chromium	M16-Ma25099	CP		mg/kg
Copper	M16-Ma25099	CP		mg/kg
Lead	M16-Ma25099	CP		mg/kg
Mercury	M16-Ma25371	NCP		mg/kg
Nickel	M16-Ma25099	CP		mg/kg
Zinc	M16-Ma25099	CP		mg/kg
Duplicate				
% Moisture	M16-Ma25205	NCP		%

Comments

Sample Integrity

Custody Seals Intact (if used)
 Attempt to Chill was evident
 Sample correctly preserved
 Appropriate sample containers have been used
 Sample containers for volatile analysis received with minimal headspace
 Samples received within HoldingTime
 Some samples have been subcontracted

Authorised By

Onur Mehmet	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Rhys Thomas	Senior Analyst-Asbestos (NSW)



**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
 Uncertainty data is available on request

Eurofins | mgt shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of an analytical test and/or the release for future to meet customer and test production arising from this report. This document shall not be reproduced except as

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**Glenn Jackson
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20-04-03-60306-01

2 June 2017

Conor Parker
Environment Canterbury
PO Box 345
Christchurch 8140

Tēnā koe Conor Parker

Ngā mihi I ngā tini āhuatanga o te wā,

Funding approval for ^{s 9(2)(a)} project

Thank you for your application to the Contaminated Sites Remediation Fund (CSRF). I am pleased to tell you that the Minister for the Environment has approved your application and granted you ^{s 9(2)(b)(ii)} from the fund.

The Ministry expects that the residents will be kept fully informed of the progress and findings of the project. The landfill will need to be delineated as part of the project and a robust sampling plan will need to be developed in conjunction with setting good data quality objectives.

You will be required to submit a Project Management Plan (Project Plan) to the Ministry. The Ministry will supply you with a Project Plan template, but you are welcome to use your own as long as it shows how the outcomes from your application will be delivered.

Your Project Plan should also include sufficient detail on how you will manage:

- Risk management
- Health and Safety
- Quality Assurance
- Communication strategies with project stakeholders including a reporting schedule.

The project plan should also contain a schedule that clearly identifies the project milestones, and for each milestone the following details:

- the tasks to be completed
- the expected deliverables
- the completion dates, and
- the financial contributions (total and CSRF).

After an acceptable Project Plan has been delivered to the Ministry we will contact you to discuss the development of a project funding agreement (funding deed) to outline the work that will be funded. Expenses incurred before the deed is signed by both parties are not eligible for reimbursement.

Funding is not guaranteed until you have a signed funding deed with the Ministry.

David Jackson has been assigned as your main point of contact during the Project Plan's development. David will provide you with support, but cannot provide specific advice on writing your Project Plan.

Next steps

The table below illustrates the next steps required from you to proceed.

Step No.	
1	Read the <i>Guide for Grantees</i> thoroughly as it contains information about what happens at deed and Project Plan development stages.
2	Commence drafting your Project Plan The information in the guide will also be useful when drafting your Project Plan. Your Project Plan is due to the Ministry by 30 June 2017.

Please contact David Jackson at David.Jackson@mfe.govt.nz if you have any queries.

Please note that this letter does not constitute a binding agreement.

Nāku noa, nā,

Hinemoa Awatere
Manager, Hono Tātaki – Resource Efficiency and Innovation

Canterbury

District Health Board

Te Poari Hauora o Waitaha

Contaminated Sites Remediation Fund
Ministry for the Environment
Environment House
23 Kate Sheppard Place,
Wellington

7th September 2018

To Whom It May Concern

Re: **s 9(2)(a)** Contaminated Land Remediation

The Community and Public Health division of the Canterbury District Health Board have been working with Environment Canterbury and the Christchurch City Council regarding the contamination of multiple properties in **s 9(2)(a)**, Christchurch since early 2016.

This situation is a significant health risk to residents whose properties have been found to have exceptionally high concentrations of lead in the soil. The readily accessible exposure routes due to the contamination being present close to the surface and no physical controls between site users and the contaminated soil, heighten the risk.

Contamination of the land with lead was confirmed by a Detailed Site Investigation earlier this year. Following this the Medical Officer of Health Dr Ramon Pink recommended that the residents risk of exposure to lead be assessed, based on the concentration of lead in the soil and on other risk factors including the ways in which residents use the land, high risk demographic groups including children, pregnant women and those with underlying health conditions.

We have advised residents to only use raised vegetable gardens with soil from a trusted source, to raise any compost bins and to avoid using soil from the property for composting. Remediation of the contaminated soil would be the optimal long term solution to eliminate the risk of exposure.

The CDHB supports Environment Canterbury's application to the Contaminated Sites Remediation Fund and considers that this case would be a vital use of the CSRF.

Kind Regards,



Dr Ramon Pink
Medical Officer of Health

Community & Public Health, PO Box 1475, Christchurch Telephone 03 364 1777 Facsimile 03 379 6125

◆Christchurch Office: PO Box 1475, Christchurch Telephone 03 364 1777 ◆Ashburton Office: PO Box 110, Ashburton Telephone 03 307 6902
◆West Coast Office: PO Box 443, Greymouth Telephone 03 768 1160 ◆South Canterbury Office: PO Box 510, Timaru Telephone 03 687 2600

www.cph.co.nz

Memo

Date	21 March 2017
To	Tracey Weston
CC	Nigel Grant, Brodie Young
From	Davina McNickel

Christchurch City Council contribution towards testing costs at

s 9(2)(a)


The soil sampling we have done at the s 9(2)(a) landfill has shown that more testing is necessary to understand the extent of contamination present so that a solution can be identified. The cost of this work has been estimated at s 9(2)(b)(ii) and with contingency applied it is likely costs could increase to s 9(2)(b)(ii). We are preparing an application to the Ministry for the Environment's contaminated sites remediation fund (due 31st March) asking for s 9(2)(b)(ii) to conduct that work. Part of our discussion with the landowners was that both Christchurch City Council and Environment Canterbury would agree to put forward funds to supplement any successful bid for assistance from the fund.

This memo seeks confirmation from you that Christchurch City Council are willing to contribute s 9(2)(b)(ii) for additional testing at s 9(2)(b)(ii) if the funding bid is successful. Environment Canterbury will also contribute the same amount.

If you are in agreement, please sign and return this form to me, at Davina.mcnickel@ecan.govt.nz. If you have questions, please call me on 0275497718. As the fund application is due on 31st March, I will need this confirmation by Friday 24th March.

Christchurch City Council agrees to contribute funds of s 9(2)(b)(ii) if an application to MfE's contaminated sites remediation fund is successful.

Name: Tracey Weston

Signature: 

Date: 22/3/2017

Kind regards



Davina McNickel
Team Leader Contaminated Sites
Environment Canterbury



27 September 2018

Contaminated Site Remediation Fund
Ministry for the Environment
PO Box 10362
Wellington 6143

Customer Services
P. 03 353 9007 or 0800 324 636

PO Box 345
Christchurch 8140

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

To the Panel,

Environment Canterbury request that s 9(2)(a) Landfill be included in the September 2018 funding round. s 9(2)(b)(ii) Landfill is an area of historical fill unidentified until 2015 in a residential neighbourhood. s 9(2)(a) Landfill should be a priority for the fund due to the concentrations of contaminants found at the site, the number of properties and residents affected, and the potential risk to the wellbeing of residents living there.

Concentrations of contaminants such as lead and benzo(a)pyrene in surface soil across more than twenty properties are an order of magnitude greater than the residential soil contaminant standards; in places lead is two orders of magnitude greater. The highest recorded lead result was 16,500 mg/kg. Fill material has been found up to four metres depth.

The principal pathway for exposure to the contaminants present is by ingestion. The properties covered by the application are the homes of thirty-five residents including children from the age of two years to retirees in their eighties. Many residents are keen gardeners with nearly half of the properties having had active vegetable gardens. Young children and pets can easily come into direct contact with contaminated fill from uncovered areas and soil can be tracked inside homes.

Where contaminants are more than twice the soil contaminant standard, behavioural management without a physical barrier between site contamination and site users is not appropriate. Contamination has been found at surface and there are currently no physical controls beyond existing paved surfaces and structures. Community and Public Health of the Canterbury District Health Board have made blood tests available for residents at risk from lead exposure; fortunately, no results have shown significant blood lead concentrations to date.

The community are in full support of this application and have been engaged with Environment Canterbury from the end of 2016. Given the potential health concerns and the level of community goodwill established, remediation of the site should occur as soon as possible. The remediation option agreed with residents is the most practical long-term solution with the best reduction in exposure to contamination at a realistic financial cost.

Please prioritise s 9(2)(b)(ii), s 9(2)(a) Landfill in the September funding round. The proposed remediation will improve the wellbeing of the affected community now and in the future.

Yours sincerely,

Bill Bayfield
Chief Executive

Released under the Official Information Act 1982

Canterbury

District Health Board

Te Poari Hauora o Waitaha

15th August 2019

Contaminated Sites Remediation Fund
Ministry for the Environment
Environment House
23 Kate Sheppard Place,
Wellington

To Whom It May Concern

Dear Sir / Madam,

Re: s 9(2)(a) Contaminated Land Remediation – proposal for funding from the Contaminated Sites Remediation Fund (CSRF)

Community and Public Health, a division of Canterbury District Health Board (CDHB), wrote a letter in support (in September 2018) of Environment Canterbury's application for funding for the remediation of contaminated residential sites in the suburb of s 9(2)(a) Christchurch

It was pleasing to hear partial funding was allocated to the contaminated residential sites, however the difference between the cost of remediation and the funding provided will still be significant for many of the applicants.

Due to the potentially significant public health risk to residents, the CDHB strongly urges the Ministry for the Environment to re-consider the funding allocation and fully fund the costs associated with the remediation of the s 9(2)(a) properties.

The ongoing financial pressure and stress experienced by residents, in addition to the physical risk of exposure to lead contamination, could negatively impact on their health.

The CDHB supports Environment Canterbury's reapplication to the Contaminated Sites Remediation Fund requesting 100% funding for remediation of the s 9(2)(a) properties.

Thank you for your consideration.

Kind Regards,



Dr Ramon Pink
Medical Officer of Health

Community & Public Health, PO Box 1475, Christchurch Telephone 03 364 1777 Facsimile 03 379 6125

◆Christchurch Office: PO Box 1475, Christchurch Telephone 03 364 1777 ◆Ashburton Office: PO Box 110, Ashburton Telephone 03 307 6902
◆West Coast Office: PO Box 443, Greymouth Telephone 03 768 1160 ◆South Canterbury Office: PO Box 510, Timaru Telephone 03 687 2600

16 April 2019

Conor Parker
Environment Canterbury
conor.parker@ecan.govt.nz

Tēnā koe Conor,

s 9(2)(a) **Landfill – Invite to Stage 2 Contaminated Sites Remediation Fund**

Thank you very much for submitting your application entitled s 9(2)(a), which was received in Round 2 of the 2018/19 Contaminated Sites Remediation Fund (CSRF). We appreciate the amount of work involved in preparing an application and thank you for your patience in waiting for a decision.

I am pleased to inform you that you are invited to proceed to Stage 2 of the funding process. The maximum funding available is up to s 9(2)(b)(ii) over the duration of the project.

Please note that conditions of funding have been identified during the assessment process. For your application, these are:

- Receipt of letters of commitment from landowners required prior to signing the deed of funding
- The funding amounts are allocated to the following sub-projects:
 - Twelve pre-discovery properties - s 9(2)(b)(ii)
 - s 9(2)(a)
 - s 9(2)(a)

Requirements of Stage 2:

During Stage 2, you will be required to submit a work programme, project budget and an annual work plan to the Ministry for the Environment (the Ministry). You must develop these using Ministry templates, which will be provided to you shortly. The completed templates must demonstrate how you will deliver your project in sufficient detail to support the deed of funding. Funding is not guaranteed until each of these documents has been accepted by the Ministry and both parties have signed a deed of funding.



A representative from the Ministry's Contaminated Sites Remediation Fund team are available to meet with you in person. This will be an opportunity for you to discuss your project in detail and ask any questions about the next steps.

If your project documents are approved, a deed of funding will be developed for signature by your organisation and the Ministry. Please note, expenses related to the delivery of the project incurred before the deed of funding is signed by both parties are not eligible for reimbursement.

Please Note:

- The work programme, annual work plan and deed of funding must be agreed by both parties no later than 6 months from the date of this letter, after which the offer of funding may expire.
- Expenses related to the delivery of the project incurred before the deed of funding is signed by both parties are not eligible for funding.
- The Minister for the Environment will announce all approved projects. Please ensure that you do not release the details of your project in relation to the Contaminated Sites Remediation Fund before the Minister's announcement.

Next Steps:

The table below illustrates the next steps required from you to proceed to Stage 2.

Step No.	Action	Key Dates
1	<p>Confirm that you intend to proceed with Stage 2 of the application process.</p> <p>Please read the enclosed <i>Confirmation of Intent to Proceed</i> form to ensure that you are able to satisfy all the points covered by the declaration.</p> <p>Should you choose to proceed, complete and sign the confirmation form and email it back to Bruce.coucher@mfe.govt.nz</p> <p>If you choose not to proceed, please let us know as early as possible.</p>	7 Days from date of letter
2	<p>Stage 2 meeting</p> <p>This meeting will be an opportunity to talk through your work programme and annual work plan and ask any questions about the funding process.</p> <p>A draft work programme, annual work plan and deed of funding will be emailed to you shortly before the meeting. Note that some of the sections will be pre-populated with information from your application form.</p>	Within 1 month from notification of funding approval

Step No.	Action	Key Dates
	We recommend that you undertake a legal review of the deed of funding to confirm your acceptance of all the clauses.	
3	<p>Commence drafting your work programme, project budget, and annual work plan.</p> <p>We recommend that you commence drafting your work programme and annual work plan as soon as possible after the Stage 2 meeting. Applicants must complete the first draft of the work programme within 4 weeks of the Stage 2 meeting.</p> <p>Funding approval is dependent on the development of a satisfactory project documents. These documents are in turn used to create the deed of funding for your project.</p>	4 weeks from the Stage 2 meeting
4	<p>Finalise work programme, project budget, annual plan and deed of funding</p> <p>The work programme, annual work plan and deed of funding must be agreed and signed by both parties no later than 6 months from the date of this letter. After this date, the offer of funding may be withdrawn.</p> <p>Delivery of your project may only commence once the deed of funding is signed by a person with the relevant financial delegation within your organisation and the Ministry.</p>	Up to 6 months from the date of this later

Please contact Bruce Croucher at Bruce.Croucher@mfe.govt.nz, or on 022 592 2826, if you have any queries at this stage.

Please note that this letter does not constitute a binding agreement.

Nāku noa, nā,

Phillipa Guthrey
 Manager, Contaminated Land

Contaminated Sites Remediation Fund DEED OF FUNDING



Ministry for the

Environment

Manatū Mō Te Taiao

PART A: PARTIES AND PROJECT	
DEED OF FUNDING	The Recipient has applied and been approved for a funding grant from the Contaminated Sites Remediation Fund, administered by the Ministry. The grant is subject to the terms of this Deed of funding. This Deed is made up of the following parts: <ol style="list-style-type: none"> 1. Part A: Project and Parties 2. Part B: Special Terms 3. Part C: General Terms 4. Any Schedules and Annexures attached to this Deed or incorporated by reference.
DEED NUMBER	[generated by MfE]
PARTIES	
MINISTRY	HER MAJESTY THE QUEEN in right of New Zealand, acting by and through the Secretary for the Environment
RECIPIENT	Full legal name: Canterbury Regional Council
	Trading name (if different): Environment Canterbury
LAND OWNER(s) (if any)	Full legal name:
	Trading name (if different):
GUARANTOR(s) (if any)	Full legal name:
	Trading name (if different):

PROJECT		
PROJECT NAME	s 9(2)(a) s 9(2) Landfill Investigation ()	
COMMENCEMENT DATE	On the later of the date that this Deed is signed by the Parties or the date on which the conditions in special term 1 are met.	
PROJECT PURPOSE	<p>The purpose for which the Grant is provided is:</p> <p>For ECan's investigation and delineation of the s 9(2)(a) former landfill site.</p> <p>Note that:</p> <p>a. in assessing an application and approving funding there is no assessment of liability</p> <p>b. the Crown is not liable for any Project or site by reason only of Grant from CSRF being made.</p>	
SUMMARY OF KEY PROJECT REQUIREMENTS	The Deliverables for the Project are set out in the Project Management Plan.	
PROPERTY DETAILS	<p>Property address: As detailed in Annexure 3 to this Deed.</p> <p>Legal description: As described in Annexure 3 to this Deed.</p>	
CONTACT DETAILS		
RECIPIENT CONTACT DETAILS	Postal address: PO Box 345, Christchurch 8140	
	Physical address: 200 Tuam Street, Christchurch 8011	
	MAIN CONTACT PERSON	BACKUP CONTACT PERSON
	Name: Conor Parker	Name: Davina McNickel
	Title: Contaminated Sites Officer	Title: Team Leader – Contaminated Sites
	Phone:	Phone:
	Mobile: s 9(2)(a)	Mobile: 027 549 7718
	Email: conor.parker@ecan.govt.nz	Email: Davina.mcnickel@ecan.govt.nz
MINISTRY DETAILS	Postal Address: Ministry for the Environment, PO Box 10362, Wellington 6143	
	Physical Address: Environment House, 23 Kate Sheppard Place, Wellington 6012	
	MAIN CONTACT PERSON	BACKUP CONTACT PERSON
Name: Kim Wepasnick	Name: Bruce Croucher	

	Title: Analyst	Title: Senior Analyst (Science)
	Phone: +64 022 010 4351	Phone: +64 027 292 7086
	Email: Kim.Wepasnick@mfe.govt.nz	Email: bruce.croucher@mfe.govt.nz
LAND OWNER DETAILS	Postal address: N/A	
	Physical address:	
	MAIN CONTACT PERSON	BACKUP CONTACT PERSON
	Name:	Name:
	Title:	Title:
	Phone:	Phone:
	Mobile:	Mobile:
	Email:	Email:
GUARANTOR DETAILS	Postal address: N/A	
	Physical address:	
	MAIN CONTACT PERSON	BACKUP CONTACT PERSON
	Name:	Name:
	Title:	Title:
	Phone: +64	Phone: +64
	Email:	Email:

Released under the Official Information Act 1982

PART B: SPECIAL TERMS**1. Land Owner:**

- (a) The Parties acknowledge the s 9(2)(a) former landfill site covers multiple properties owned by multiple, different Land Owners.
- (b) For the purposes of this Deed:
 - (i) The Land Owners will not be party to or sign this Deed;
 - (ii) The Recipient will obtain written agreement, using the form in Annexure 2 to this Deed, from the Land Owner of each Property to enable the Recipient to undertake Phase 2 activities on the Property and provide a copy of such agreement to the Ministry as a Deliverable for Milestone 1 of Phase 2;
 - (iii) The address and legal description of each Property is listed in Annexure 3 to this Deed. If the Recipient is unable to obtain written agreement from any Land Owner further to special term 3(b)(ii), Annexure 3 will be amended in accordance with clause 3.3 (Changes) of Part C;
 - (iv) Section 6 (Land Owner Obligations) does not apply; and
 - (v) Any reference to Land Owner rights or obligations in clauses 1.2(g) (Interpretation), 2.6 (Public Statements), 2.7 (Ministry Termination) of Part C and Schedule 3 (Audit) does not apply.

PART C: GENERAL TERMS

Section 1: Definitions and Interpretation

1.1 **Definitions:** In this Deed, unless the context requires otherwise, the following definitions shall apply:

"**Application**" means the Recipient's application for the Grant;

"**Budget**" means the Project budget set out in the Project Management Plan;

"**Commencement Date**" has the meaning given to it in Part A of this Deed;

"**Completion Date**" means the Milestone Date of the final Milestone for the Project, as set out in the Project Management Plan;

"**Contaminated Land**" means that part of each Property that is contaminated as detailed in the site map detailed in Schedule 1 to this Deed;

"**CSRF**" means the Contaminated Sites Remediation Fund;

"**Deed**" means the legal agreement between the Ministry and the Recipient that comprises Parts A-C of this deed, and any and all Schedules, Annexures and Project Management Plans attached or incorporated by reference;

"**Deliverable**" means any deliverable the Recipient shall complete as part of the Project as set out in this Deed;

"**Estimated Cost**" means the estimated cost for a particular Deliverable as detailed in the Project Management Plan;

"**Financial Year**" means any 12 calendar month period, or part period thereof, commencing on the Commencement Date;

"**Force Majeure Event**" means:

- (a) fire, explosion, lightning, storm, flood, bursting or overflowing of water tanks, apparatus or pipes, earthquakes, riot and civil commotion;
- (b) failure by any utility company or other like body to carry out works or provide services;
- (c) any failure or shortage of fuel or transport;
- (d) war, civil war, armed conflict or terrorism;
- (e) any official or unofficial strike, lockout or other labour dispute;
- (f) governmental action; or
- (g) such other substantially similar circumstances which prevents any of the Parties from performing its obligations under this Deed;

"**Grant**" means the sum of funding provided by the Ministry from the CSRF pursuant to this Deed;

"**Intellectual Property**" means all manner of intellectual property rights including (without limitation) patents, trade marks and service marks, logos, copyright, design rights and know-how whether registrable or not in any country;

"**Land Owner**" means the registered proprietor(s) as described in Part A of this Deed of the Property;

"**Milestone**" means any milestone the Recipient shall complete as part of the Project as set out in the Project Management Plan;

"**Milestone Date**" means the due date for successful completion of the relevant Milestone, as specified in the Project Management Plan;

"**Milestone Payment**" means the amount of Grant payable upon successful completion of the relevant Milestone, as specified in the Project Management Plan;

"**Minister**" means the Minister for the Environment;

"**Parties**" means the Ministry, the Recipient, the Land Owner (if any) and the Guarantor (if any);

"Phase 2" means the site investigation phase of the Contaminated Land more particularly described in the Project Management Plan;

"Phase 3" means remediation planning in relation to the Contaminated Land more particularly described in the Project Management Plan;

"Phase 4" means the site remediation of the Contaminated Land more particularly described in the Project Management Plan;

"Project" means the remediation project to be completed by the Recipient under and in accordance with this Deed, as specified in the Project Management Plan;

"Project Costs" means those costs that are reasonable and either:

- (a) directly attributable to the Deliverables; or
- (b) if they cannot be directly attributed to the Deliverables, can be allocated to the Project in accordance with a standard cost allocation system and cost drivers,

measured in standard accrual accounting terms and excluding:

- (c) any mark up or profit margin by the Recipient (or a Sub-Recipient); and
- (d) any costs based on theoretical or perceived market rates;

"Project Executive" means the project executive appointed by the Recipient in accordance with clause 4.5 in Part C of this Deed;

"Project Management Plan" means the plan prepared by the Recipient (and approved by the Ministry) outlining how the Recipient will manage the Project, including its project management structure and the best practice methodologies, systems and tools that the Recipient will use. The Plan should include the following information, where applicable:

- (a) background, including identifying the benefits of undertaking the Project;
- (b) purpose and objectives;
- (c) general overview of the Phases, stages of work, and scope;
- (d) the Budget;
- (e) the Milestones, Milestone Dates, Milestone Payments and Deliverables (including the Estimated Costs and Estimated Deliverable Cap);
- (f) personnel;
- (g) subcontractors and restrictions on their use;
- (h) timescales;
- (i) communications plan;
- (j) stakeholder engagement plan;
- (k) quality control procedures (including the appointment of a project auditor);
- (l) health and safety management plan;
- (m) Project Status Report template;
- (n) risk register;
- (o) issue register; and
- (p) project evaluation;

"Project Manager" means the project manager appointed by the Recipient in accordance with clause 4.4 in Part C of this Deed;

"Property" means the properties or, as the context requires, a particular property or particular group of properties detailed in Part A of this Deed;

"Sub-Recipient" means any person or body which the Recipient funds in whole or in part from the Grant whether as a supplier, contractor or otherwise and whether by payment or grant;

and

"Working Day" means any day on which banks are generally open for business in Wellington (other than Saturday, Sunday or a public holiday).

1.2 **Interpretation:** In the interpretation of this Deed, unless otherwise stated:

- (a) no executive or prerogative power or right, or any immunity, of the Crown is affected by this Deed;
- (b) "including" and similar words do not imply any limitation;
- (c) reference to the singular includes the plural and vice versa and references to any gender includes both genders;
- (d) headings are included for ease of reference only and shall not affect the interpretation of this Deed;
- (e) references to clauses and schedules are references to clauses of and schedules to this Deed;
- (f) amounts are in NZ\$ and exclude GST (if any);
- (g) if the Recipient, the Land Owner (if any) or the Guarantor (if any) comprise more than one person, each of those persons' or legal entities' liability to the Ministry is joint and several;
- (h) references to a party or a person includes any form of entity and their respective successors, assigns and representatives; and
- (i) any statutory reference includes any statutory extension, amendment, consolidation or re-enactment and any statutory instrument, order or regulation made under any statute for the time being in force.

1.3 **Precedence:** In the event of a conflict between:

- (a) the terms of Part B and Part C of this Deed, Part B (Special Terms) shall take precedence; and
- (b) Parts A-C of this Deed, and any plan (including the Project Management Plan), Parts A-C of this Deed shall take precedence.

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Section 2: The Grant

- 2.1 **Grant amount:** Subject to clause 2.2, the Ministry approves the Grant for each Phase of the Project as follows:

Phase 2	The lesser of: s 9(2)(a) or 70% of the actual cost of the Phase*
*Assessed over the duration of the Project, approved by the Ministry and specified in the Project Management Plan.	

- 2.2 **Maximum:** Under no circumstances shall the funding payable to the Recipient exceed \$70,000.
- 2.3 **Full funding obtained:** The Recipient warrants and represents that it has obtained the full funding required to complete the Project.
- 2.4 **Use of Grant:** The Recipient must only use the Grant for proper purposes and within the scope of the Project. The Ministry may recover any Grant monies which are misappropriated or not spent in accordance with this Deed. In particular, the Recipient shall:
- (a) ensure that the Grant is only used for costs that are Project Costs and, to the extent the costs allocated to the Project also relate to other purposes of the Recipient, are allocated in a proportional manner;
 - (b) ensure that expenses incurred in carrying out the Project are reasonable and in accordance with Schedule 5 (Expense Policy);
 - (c) not use any part of the Grant for costs incurred by the Recipient in acquiring an asset, enhancing an asset or in bringing an asset to working order or to a state, to produce the goods or render the services as required for the Project;
 - (d) account for the Grant received under this Deed in accordance with generally accepted accounting practices, with appropriate internal controls to ensure that the Grant is applied for the purposes of this Deed;
 - (e) establish, and maintain for the period of the Project, cost codes that relate specifically to all costs incurred for the purposes of this Project so that the Project Costs can be categorised and reported by their nature;
 - (f) comply with any cost policies provided by the Ministry from time to time in relation to the accounting treatment of Project Costs and use of the Grant;
 - (g) follow appropriate procurement processes when buying goods or services for the Project so that only reasonable, open market costs are incurred on an arm's length basis avoiding any conflict of interest. If a conflict of interest is unavoidable the conflict must be declared to the Ministry and managed appropriately by the Recipient;
 - (h) not claim for costs or expenses that have been, or will be, claimed from other sources, except as expressly provided for in this Deed; and
 - (i) not claim or use any part of the Grant to support or assist activities which are political (e.g. supporting a political party or movement, running a political campaign, or lobbying against the Government).
- 2.5 **Eligibility:** Without prejudice to any other rights to which the Ministry may be entitled, the Recipient accepts that eligibility for payment of the Grant may, at the Ministry's sole discretion, be lost if:
- (a) claims for payment and related information are not given to the Ministry by the day thirty days following the due date of the final Deliverable; or
 - (b) the Project is not completed by the Completion Date; or
 - (c) the Project is not completed by and claims for payment (and any required supporting documentation) are not given to the Ministry by the end of the Financial Year in which the Completion Date falls.
- 2.6 **Public statements:**

- (a) The Recipient, Land Owner(s) (if any) and Guarantor (if any) shall ensure no public statement is made by or on their behalf (or by any Sub-Recipient) relating to the commencement of this Deed, the Grant or the Project before the earlier of:
- (i) such a statement is made by the Ministry or Minister; or
 - (ii) the date 60 days after the Commencement Date.
- (b) Prior to the release of any information to the public or media, all Parties shall consult with the other Parties allowing sufficient time for comment to be received and incorporated as appropriate.
- 2.7 **Ministry termination:** Without limiting its rights under clause 5.6 (Termination) or clause 6.6 (Termination of Project), the Ministry reserves the right to terminate this Deed by providing to the Recipient or a Land Owner (if any) 30 days' written notice if:
- (a) in the reasonable opinion of the Ministry the remediation of the Contaminated Land is not feasible in all the circumstances; or
 - (b) the completion of either Phase 2 or Phase 3 demonstrates to the Ministry in its absolute discretion that the subsequent Phase(s) will not result in the remediation of the Contaminated Land.
- 2.8 **Independent Assessor:**
- (a) The Ministry may from time to time appoint an independent assessor (after consultation with the Recipient) to assess and/or audit the Deliverables, any reports prepared by the Recipient and the Recipient's performance of its obligations under this Deed. The following provisions apply in respect of the assessor:
 - (vi) the Recipient must cooperate with the assessor in all respects, including by providing access to the Property, personnel (including, to avoid doubt, the Project Manager) and all relevant information and documentation as soon as it is created (to avoid doubt, the assessor may take copies of such information and documentation); and
 - (vii) the Ministry must pay the costs of the assessor except where the result of the assessment and/or audit shows material non-compliance with this Deed, in which case, the Recipient must pay those costs.
 - (b) Completion of an assessment and/or audit that is to the Ministry's satisfaction does not include an assessment of liability and is not acceptance of liability for, nor acceptance or endorsement of, the completion of the Deliverables undertaken on and at the Property.
- 2.9 **No Retrospective Costs:** The Ministry will not be liable for any costs or liabilities incurred by the Recipient prior to the Commencement Date. Each Party will bear its own costs in respect of the preparation and entry into this Deed.

Section 3: General Terms and Conditions

- 3.1 **Relationship and Authority:**
- (a) Nothing in this Deed shall constitute a partnership (being a relationship between persons carrying on a business in common with a view to profit), joint venture, principal/agent or employer/employee relationship between the Ministry and the Recipient for any purposes. The relationship between the Ministry and the Recipient is a relationship only for the supply of funding on the terms set out in this Deed.
 - (b) The Recipient does not have the Ministry's (or the Minister's) authority to say or do anything on behalf of the Ministry (or the Minister) except to the extent authorised in writing by the Ministry in each case.
- 3.2 **Entire Agreement:** This Deed contains everything the Parties have agreed on in relation to the CSRF and the Contaminated Land. No Party can rely on an earlier document, or anything said or done by another Party, or by a director, officer, agent or employee of that Party, save as permitted by law.
- 3.3 **Changes:** Any variation to this Deed (including the Project Management Plan) must be in accordance with Schedule 4 (Change Control Process).
- 3.4 **Severability:** If any term of this Deed becomes or is declared by any court to be invalid or unenforceable in any way:
- (a) such invalidity or unenforceability shall in no way impair or affect the remainder of the Deed which will remain in full force and effect; and

- (b) the invalid or unenforceable term will be replaced with a provision which as far as possible accomplishes the original purpose of the term.
- 3.5 **Waiver:** Any delay or failure by either Party at any time to exercise (in whole or in part) any right or remedy under this Deed shall not be construed as a waiver of any such right or remedy and shall not affect the validity of the Deed (in whole or in part). No waiver shall be effective unless it is expressly stated in writing to be a waiver and communicated to the other Party in writing. Any waiver will not constitute a waiver of any subsequent exercise of the same right or remedy in the future.
- 3.6 **Governing Law and Jurisdiction:** This Deed is governed by the law of New Zealand and the Parties submit to the exclusive jurisdiction of New Zealand's courts.
- 3.7 **Dispute Resolution Procedure:**
- (a) If any dispute arises out of or in connection with this Deed:
- (i) the Project Manager and a representative of the Ministry shall use all reasonable endeavours to resolve it as promptly as possible within 10 Working Days of a Party notifying the other Parties of the dispute ("Date of Notification").
- (ii) subject to such persons having met at least twice, any Party may at any time formally refer such dispute to the Project Executive and the Ministry's Manager, Hono Kaupapa Here (or his or her delegate) for resolution within 10 Working Days of the date of referral;
- (iii) subject to such persons having met at least twice, any Party may at any time formally refer such dispute to their respective Chief Executives (or equivalent) for resolution within 10 Working Days of the date of referral.
- (b) If a dispute is not settled in accordance with clause 3.7(a), any Party may refer the dispute to:
- (i) mediation or some other form of alternative dispute resolution ("Mediation") conducted in New Zealand and governed by New Zealand law; or
- (ii) the jurisdiction of the New Zealand courts.
- (c) If the Parties do not agree within 5 Working Days of reference of the dispute to Mediation (or such other period as agreed by the Parties in writing):
- (i) the resolution of the dispute;
- (ii) the mediation procedures to be adopted;
- (iii) the timetable for all steps in those procedures; and
- (iv) the selection and compensation of the independent person required for the Mediation,
- then the Parties shall mediate the dispute per the mediation rules of the Resolution Institute and the Chair of the Resolution Institute (or his or her nominee) shall select the mediator and determine the mediator's remuneration. The Parties shall make all reasonable efforts to resolve the dispute by Mediation within 3 months (or such other period as agreed by the Parties in writing) from the Date of Notification. If the dispute is not resolved by Mediation within such period, the Parties may seek any other remedies available to them.
- (d) Nothing contained in this clause 3.7 shall prevent any Party, in an emergency, seeking any interim or interlocutory relief from the court.
- (e) Each Party shall pay their own costs for resolving any dispute.
- 3.8 **Intellectual Property Rights:**
- (a) **Pre-existing Intellectual Property:** Intellectual Property owned by a Party or its licensors prior to the commencement of this Deed and Intellectual Property developed by a Party independently from this Deed, remains the property of that Party or its licensors as the case may be.
- (b) **New Intellectual Property:** Any Intellectual Property created, developed, commissioned or contracted for in the course of the Project shall become the property of the Ministry.
- (c) **Recipient Intellectual Property:** The Recipient grants to the Ministry a non-exclusive, sublicensable, royalty free, perpetual and irrevocable licence to use, modify, develop, sublicense and disseminate for any purpose all Intellectual Property owned by the Recipient or its licensors that forms part of the Deliverables.
- (d) The Recipient warrants and represents that it is legally entitled to grant the licence stated in clause 3.8(c).

- 3.9 **Third Party Rights:** Unless expressly stated no part of this Deed shall create rights in favour of any third party pursuant to the Contracts Privity Act 1982.
- 3.10 **Term:** This Deed shall commence on the Commencement Date and, subject to clauses 2.8, 5.6 and 6.6, shall continue in force until the final Milestone is achieved to the Ministry's reasonable satisfaction.
- 3.11 **Consequences of Expiry / Termination:** Termination of this Deed shall be without prejudice to any rights or liabilities accrued at the date of termination, provided that the Ministry shall cease to have any obligation to pay the Grant to the Recipient (which may, at the Ministry's sole discretion, include payment of any overdue or outstanding invoices).
- 3.12 **Notices:** Any notice given under or pursuant to this Deed shall be in writing and signed by an authorised person and may be delivered personally by hand, post or by email to the other Party at the address stated in this Deed. Notices shall be deemed delivered as follows:
- (a) if delivered personally by hand, at the time of delivery;
 - (b) if posted, on the third Working Day after posting;
 - (c) if emailed, on the day of successful transmission as confirmed by the email system;
- and
- (d) if delivered after 5pm, at 9am the next Working Day.
- 3.13 **Counterparts:** This Deed may be executed by the Parties in two or more counterparts (including emailed copies), each of which shall be deemed an original but when taken together will constitute a binding and enforceable agreement between the Parties.
- 3.14 **Force Majeure:** A Party ("the affected party") shall not be liable to another Party for any delay or failure to perform any of their obligations under this Deed if such delay or failure results from a Force Majeure Event, provided that where a Party seeks to rely upon this clause:
- (a) As soon as the affected Party becomes aware of the Force Majeure Event, it shall immediately notify the other Parties and confirm the estimated period that the delay or failure shall continue.
 - (b) The affected Party shall use its best endeavours to continue to perform its obligations under this Deed and minimise the effect of the event for the duration of any Force Majeure Event.
 - (c) If any Force Majeure Event prevents the affected Party from performing all of its obligations under the Deed for a period in excess of 30 days, any Party may terminate the Deed by notice in writing with immediate effect.
- The affected Party will not be entitled to relief under this clause in any circumstances where it has directly or indirectly caused or substantially contributed to any delay or failure in the performance of its obligations.
- 3.15 **Confidentiality:** Each Party must keep confidential and secure all information disclosed by another Party in connection with the negotiation or performance of this Deed, including the terms of this Deed (collectively "Confidential Information"). Each Party will not disclose any Confidential Information of another Party except:
- (a) with that other Party's prior written consent;
 - (b) as necessary to fulfil the its obligations in this Deed;
 - (c) to its advisors, employees or contractors (in each case on a need to know and confidential basis);
 - (d) to the extent the Confidential Information is in the public domain (other than through a breach by the Party of its obligations in this clause); or
 - (e) as otherwise required by law.
- 3.16 **Survival:** The following clauses shall remain in full force and effect after expiry or termination: clauses 3.6 (Governing Law and Jurisdiction), 3.7 (Dispute Resolution Procedure), 3.8 (Intellectual Property Rights) 3.12 (Notices), 3.15 (Confidentiality), 4.9 (Endorsement), 4.10 (Publications), 4.11 (Project Information), 4.12 (Allow Access), 4.13 (Recordkeeping), 4.14 (Official Information Requests), 4.15 (Reputations), 4.16 (Third Party Intellectual Property Rights), 4.19 (Insurance), 4.20 (Ministry Not Liable), 5.3 (Project Review), 5.4 (Ministry Publicity), 5.5 (Recovery of Grant), Schedule 3 (Audit), Schedule 6 (Printed Publications), this clause and any other clauses of this Deed which by their nature are intended to survive expiry or termination of this Deed.

Section 4: Recipient's Rights and Obligations

4.1 **Project Delivery:** The Recipient must carry out the Project and complete the Deliverables in accordance with the Project Management Plan, the terms and conditions of the Deed and to the Ministry's reasonable satisfaction. In particular the Recipient shall:

- (a) promptly and efficiently carry out the Project with due skill, care and diligence in accordance with normal standards expected for from a skilled and experienced person engaged in the same type of activity, under the same or similar circumstances;
- (b) achieve successful, timely completion of the Milestones and Deliverables on or before their due date;
- (c) give the Project appropriate priority over other activities and not divert resources away from the Project which may cause delays in its completion;
- (d) efficiently and economically source and provide everything the Recipient needs to undertake the Project at the Recipient's risk and cost;
- (e) comply with all New Zealand, and each relevant jurisdiction's, laws, codes and standards and all applicable international conventions;
- (f) without limiting the generality of clause 4.1(e), comply at all times with the requirements and provisions of the Hazardous Substances New Organisms Act 1996 (HSNO Act), Resource Management Act 1991 (RMA) and the Health and Safety at Work Act 2015 (HSWA), the Stockholm Convention, Basel Convention, Minimata Convention and any related regulations, codes of practice and industry best practice guidelines;
- (g) obtain every necessary and prudent authorisation in order to carry out the Project before any actions requiring the authorisations are commenced and comply with any such consent or authorisation; and
- (h) maintain an appropriate governance structure, including compliance with any relevant legislative requirements.

For the avoidance of doubt, the Recipient shall be responsible for the procurement and overall day-to-day management of the works and the Project. In particular the Recipient shall supervise and coordinate the appointment of any Sub-Recipient or sub-contractor.

4.2 **Invoices:** Upon completion of each Milestone the Recipient will promptly provide the Ministry with a correct tax invoice for the successful provision of that Milestone (including all relevant Deliverables), priced in accordance with the Project Management Plan and this Deed. All invoices must quote this Deed's deed number.

4.3 **Personnel:** The Recipient shall:

- (a) carry out the Project only using appropriately trained, qualified, experienced and supervised personnel;
- (b) ensure that all of its employees and personnel (including Sub-Recipients and sub-contractors) are trained in the relevant health and safety requirements applicable to the Project (confirmation of relevant training is to be provided to the Ministry if requested);
- (c) ensure that all of its employees and personnel and any other parties associated with the Project, including Sub-Recipients, sub-contractors, service providers, the public, and any visitors, undergo appropriate safety briefings and health and safety inductions;
- (d) ensure that all of its employees and personnel (including Sub-Recipients and sub-contractors) are aware of potential liabilities and obligations under the environmental laws and regulations relevant to the Project;
- (e) end the involvement with the delivery of the Project of any of the Recipient's personnel to the extent reasonably requested by the Ministry; and
- (f) ensure that any specified key personnel carry out the Project.

4.4 **Project Manager:** The Recipient will appoint for the duration of the Project an appropriately trained, qualified, and experienced project manager, to manage and supervise the Project and completion of the Deliverables. The project manager will:

- (a) be physically located near the Property (i.e. within the region of the Property);
- (b) have the authority (including appropriate financial delegations) to run the Project on a day to day basis on behalf of the Recipient within the constraints set out this Deed and in accordance with the Project Management Plan; and
- (c) ensure that the project management practices set out in the Project Management Plan are followed.

- 4.5 **Project Executive:** The Recipient will appoint an appropriately trained, qualified, and experienced project executive who is authorised to represent the Recipient in communications under this Deed and to act for the Recipient under this Deed. The Recipient may appoint an alternative or replacement project executive by written notice to the Ministry.
- 4.6 **Operational requirements:** The Recipient will
- (a) comply with reasonable security, operational and documentation requirements (particularly in relation to access to and use of property and information, hazardous substances, health and safety, environmental protection and appearance and conduct of personnel and property);
 - (b) have and comply with the Recipient's own appropriate health and safety plan that is specific to the site, and immediately notify the Ministry in writing (and, to avoid doubt, in addition to updating the risk register forming part of the Project Management Plan):
 - (i) if any hazard exists at the Property due to the Recipient's acts or omissions; and
 - (ii) of any accident or serious harm that occurs to, or is caused by, the Recipient at the Property;
 - (c) manage and supervise the Project in accordance with the Project Management Plan;
 - (d) ensure facilities and equipment used by the Recipient at the Property and to perform the Deliverables are obtained and maintained;
 - (e) not allow any unauthorised discharge of any contaminant, or making of excessive noise, by the Recipient at the Property;
 - (f) not supply any ozone depleting substance without having the necessary exemption in each case;
 - (g) comply with all Ministry guidance and standards for management of the Property on the following website: <http://www.mfe.govt.nz/issues/managing-environmental-risks/contaminated-land/managing/index.html> or as otherwise advised by the Ministry in writing from time to time;
 - (h) properly label and package every dangerous good and other hazardous substance the Recipient supplies; and
 - (i) use a waste tracking system (WasteTRACK or similar) to ensure safe disposal of contaminants.
- 4.7 **Keep the Ministry Informed:** The Recipient shall keep the Ministry properly informed in writing (and in electronic form if requested) about:
- (a) progress any important issues in relation to the Project including notifying the Ministry immediately if it becomes aware of any issues that may affect delivery of the Project in accordance with the Project Management Plan or that may require any material changes to be made in relation to the Project, or that might give rise to liability or enforcement action under any laws and obligations;
 - (b) any enforcement action commenced against the Recipient under the HSNO Act, RMA or HSWA, or any other laws, regulations, codes, standards or applicable International Convention, in any capacity; and
 - (c) material health and safety information in relation to the Project including, but not limited to:
 - (i) reports of occurrences of safety incidents, details of damaged property, unsafe or hazardous acts or conditions (as soon as practicable);
 - (ii) details of non-compliances or any details of any new hazards or significant amendments to the Recipient's safety management plan; and
 - (iii) evidence if requested, that regular health and safety meetings are held and that scheduled audits have been completed. (The Recipient agrees that a representative of the Ministry may be present at such meetings or audits or inspections from time to time.)
- 4.8 **Reports and meetings:** The Recipient shall provide the Ministry with reports as set out in Schedule 2 (Reporting), and attend meetings as set out in the Project Management Plan, and as required by the Ministry from time to time.
- 4.9 **Endorsement:** The Recipient acknowledges and agrees that the Minister does not necessarily endorse the Project and accordingly the Recipient shall not represent that the Minister endorses the Project. However, the Recipient will appropriately acknowledge the Grant in all publications and publicity about the Project (the form and content of which acknowledgement and/or with any requirements that the Ministry may specify).
- 4.10 **Publications:** The Recipient shall comply with the requirements detailed in Schedule 6 (Printed Publications) in respect of any publication arising from this Deed or the Grant.
- 4.11 **Project Information:** The Recipient shall make information about the Project (particularly outcomes) freely available to any person who wishes to use it for any non-profit purpose. The Recipient shall state in each publication (in any form) which results from the Project that the use and copying of the information for non-profit purposes is welcomed and allowed.

- 4.12 **Allow Access:** The Recipient agrees that upon the Ministry's request it shall provide, at all reasonable times and upon reasonable notice, access to the Property and the Recipient's premises, personnel and records (physical files and electronic) for the purpose of audit and verification of work undertaken in accordance with clause 5.3 and Schedule 3 (Audit) and other reasonable purposes in connection with this Deed. The Recipient shall ensure that the Ministry has the same rights of access in respect of any Sub-Recipient.
- 4.13 **Recordkeeping:** The Recipient shall keep accounts (to Generally Accepted Accounting Practice standards) and other records, and have a system acceptable to the Ministry, which enables prompt and accurate verification of any matter in relation to the Project, particularly about how the Grant has been or will be used, and what expenditure by item has been incurred. Records must be retained and available for review, audit, copying and use by the Ministry's representatives at any time during, and for at least 7 years after Completion Date.
- 4.14 **Official Information Requests:** The Recipient shall immediately inform the Ministry of any request received by it for information under the Local Government Official Information and Meetings Act 1987 or Official Information Act 1982. The Recipient shall immediately transfer to the Ministry any request received by it for information under the Official Information Act in relation to this Deed and shall advise the person requesting the information of such transfer. The Ministry and the Minister may be required to disclose information that either hold in accordance with the Official Information Act. One category of information that may not be required to be disclosed is commercially sensitive information. To assist the Ministry to assess information it holds for the purposes of the Official Information Act, the Recipient shall mark clearly all commercially sensitive information as commercially sensitive when the Recipient provides that information to the Ministry.
- 4.15 **Reputations:** The Recipient shall not, and use its best endeavours to ensure that its advisers, employees, contractors or any other persons do not, do anything that may attract adverse publicity or damage the reputation of or otherwise bring into disrepute, the CSRF, the Minister, the Ministry or the New Zealand Government.
- 4.16 **Third Party Intellectual Property Rights:** The Recipient:
- (a) warrants that it has a legal entitlement to use the Intellectual Property provided as part of the Deliverables and that providing the Deliverables does not infringe the Intellectual Property of any third party; and
 - (b) indemnifies the Ministry against any claim arising from the Recipient's infringement or alleged infringement of any third party's Intellectual Property or the Ministry's claim of Intellectual Property developed under or in connection with this Deed.
- 4.17 **Representations and Warranties:** The Recipient represents and warrants to the Ministry that:
- (a) it has full power and authority to enter into and perform this Deed and this Deed has been executed by a duly authorised representative of the Recipient;
 - (b) all information, documents and accounts of the Recipient submitted to the Ministry for its appraisal of the Project for the purposes of this Deed are true and accurate and no change has occurred since the date on which such information was supplied which renders the same untrue or misleading in any respect and that there has been no material adverse change in the business, assets, operations or prospects of the Recipient since such information was provided; and
 - (c) the Recipient has disclosed to the Ministry all information which would or might reasonably be thought to influence the Ministry in awarding the Grant to the Recipient or the amount thereof.
- 4.18 **Assignment and Sub-Contracting:**
- (a) The Recipient's rights to the Grant pursuant to this Deed are exclusive to the Recipient and the Recipient must not assign or otherwise transfer any benefit or burden of this Deed.
 - (b) The Recipient shall not sub-contract any of its obligations under this Deed, or make any sub-grant under this Deed, except in accordance with the Project Management Plan or otherwise without the prior written consent of the Ministry (such consent to be given or withheld at the absolute discretion of the Ministry), and such consent (if given) may be made subject to any conditions which the Ministry considers necessary. In seeking consent to sub-contract any part of the Project or make any sub-grant, the Recipient shall disclose in writing to the Ministry all material interests, including all direct or indirect financial interests, in the proposed Sub-Recipient. The Ministry may withdraw its consent to any Sub-Recipient where it has reasonable grounds to no longer approve of the Sub-Recipient or the sub-contracting or sub-grant arrangement and such grounds will be notified in writing to the Recipient.
 - (c) The Recipient will remain wholly responsible for the acts and omissions of all Sub-Recipients and/or the work and acts of all of all Sub-Recipients.

- 4.19 **Insurance:** The Recipient must, at the Recipient's cost, have and maintain appropriate insurance cover with a reputable insurance company to cover its liabilities and the liabilities of any contractors or sub-contractors arising out of the Project (including public liability and professional indemnity cover for single events of the greater of \$5,000,000 or 5 times the estimated aggregate Project cost) during, and for a period of 36 months following the termination or expiry of this Deed. The Recipient will carry sufficient insurances to cover costs in the event of non-compliance with consent conditions, or discharge of contaminants from the Property. The Recipient shall provide the Ministry with evidence to the Ministry's reasonable satisfaction of such cover upon demand.
- 4.20 **Ministry not liable:** The Ministry will not be liable (in contract or tort, including negligence), equity of otherwise to the Recipient or any other person for any indirect damage, loss or cost whatsoever including any loss of income, profits, savings or goodwill or for any indirect or inconsequential loss or special or exemplary damages in relation to this Deed, and for the avoidance of doubt the Recipient acknowledges that the Property is not a Crown liability and nothing in this Deed binds the Crown to pay any money for any purposes in relation to that Property, except for the purposes in this Deed. Accordingly, the Recipient acknowledges and agrees that it will indemnify the Ministry for any loss, damage or liability incurred by the Ministry as a result of any claim or action arising from this Deed.
- 4.21 **Health and safety systems:** At all times the Recipient will have in place, implement and operate safety management systems which comply with the HSWA and any applicable regulations, codes of practice and industry best practice guidelines. The Recipient is required to ensure that all safe work procedures and practices developed for the Project meet all statutory and regulatory requirements.

Section 5: Ministry's Rights and Obligations

- 5.1 **Payment:** The Ministry shall pay the relevant portion of the Grant from the CSRF in arrears to the Recipient upon the Recipient's successful completion of each Milestone (including all relevant Deliverables), as set out in the Project Management Plan, subject to:
- (a) the Recipient's compliance with the terms of this Deed; and
 - (b) the availability of funds, or reductions, in the CSRF due to Parliamentary appropriation reasons or directives of the New Zealand Government.
- 5.2 **Invoice:** Payment of any Grant monies is not due until the Ministry has received a detailed tax invoice (with supporting documentation, if required) from the Recipient and the Milestone (including all relevant Deliverables) to which the tax invoice relates has been completed to the Ministry's reasonable satisfaction. Sufficient evidence of the costs incurred by the Recipient in undertaking the Project shall be provided promptly upon the Ministry's request.
- 5.3 **Project Review:** The Ministry may, in accordance with clause 4.12 (Allow Access), observe and inspect anything at any time in relation to the Project and for the purposes of audit in accordance with Schedule 3 (Audit).
- 5.4 **Ministry Publicity:** The Ministry may disclose (including via the Ministry's website on the Internet) any information in relation to the Project to anyone at any time, provided that the Ministry shall not disclose information that is deemed by the Ministry to be commercially sensitive.
- 5.5 **Recovery of Grant:**
- (a) The Ministry may reduce, suspend, or withhold, the Grant if:
 - (i) the Ministry judges the performance of the Project to be unsatisfactory;
 - (ii) the Recipient breaches clause 2.4 (Use of Grant) of this Deed or fails to comply with any other term or condition of this Deed that the Ministry considers to be material;
 - (iii) any enforcement action is commenced against the Recipient under laws, regulations, codes, standards or any applicable conventions in relation to the Project or in any other capacity;
 - (iv) the Deed is terminated in accordance with clause 5.6 (Termination);
 - (v) there is a substantial change to the Project which the Ministry has not approved;
 - (vi) any information provided in the application for funding, in a claim for payment, or in subsequent or supporting correspondence is found to be incorrect or incomplete to an extent which the Ministry considers to be material;
 - (vii) if the Ministry judges the performance of the Recipient regarding health and safety in relation to the Project to be unsatisfactory;
 - (viii) the Ministry has consented to a change in the Project which in its opinion reduces the amount of Grant needed; or

- (ix) any other circumstances or events that in the reasonable opinion of the Ministry are likely to adversely affect the Recipient's ability to deliver the Project in accordance with the requirements for the delivery of the Project or result in a risk that the Project as approved will not be completed.
- (b) The Ministry may require all or part of the Grant to be repaid if the Recipient breaches clause 2.4 (Use of Grant) of this Deed or fails to comply with any other term or condition of this Deed that the Ministry considers to be material.
- (c) The Recipient agrees that on receipt of notice requiring repayment of Grant under clause 5.5(b) it shall make such repayment within 20 Working Days of the date of the notice.
- 5.6 **Termination:** Without prejudice to any other rights to which the Ministry may be entitled, if:
- (a) the Recipient breaches, threatens to breach, or fails to properly or promptly perform, any of the Recipient's obligations in a way that the Ministry considers to be material;
- (b) any direct or indirect change of ownership or control of the Recipient occurs which is contrary to clause 4.18 (Assignment & Sub-Contracting) and in the reasonable opinion of the Ministry reduces the Recipient's ability to perform its obligations under this Deed;
- (c) the Recipient is or becomes insolvent or bankrupt, is in or goes into voluntary or compulsory administration, receivership or liquidation;
- (d) the Ministry believes that the Recipient is generally in financial difficulty which, in the reasonable opinion of the Ministry, reduces the Recipient's ability to perform its obligations under this Deed;
- (e) the Ministry reasonably considers that the Recipient:
- (i) is bringing the CSRF, the Ministry, the Minister or the New Zealand Government into disrepute; and/or
- (ii) has become undesirable in light of the CSRF's objectives or those of the Minister;
- (f) any enforcement action against the Recipient is successful under laws, regulations, codes, standards or any applicable conventions in relation to the Project; and/or
- (g) the Ministry judges the performance of the Recipient regarding health and safety in relation to the Project to be unsatisfactory,
- then the Ministry may:
- (h) withhold any payment otherwise due to the Recipient until the matter is resolved to the Ministry's reasonable satisfaction; and/or
- (i) suspend or terminate (in whole or in part) this Deed by written notice to the Recipient with immediate effect.
- 5.7 **Termination by Notice:** The Ministry may terminate this Deed at any time by giving the Recipient at least one month's written notice being under no obligation to provide further funding.

Section 6: Land Owner Obligations
(If no Land Owner is specified in Part A of this Deed, the Land Owner's Obligations do not apply)

Each Land Owner:

- 6.1 **Land Owner Contributions:** will make those owner funding contributions to the Project to the amounts, and at the times, specified in the Project Management Plan.
- 6.2 **Reasonable access:** will provide the Recipient and/or the Ministry with reasonable access to their Property as required in order to comply with the terms of this Deed.
- 6.3 **Betterment Return:** will pay to the Ministry the Betterment Return in accordance with Part B (Special Terms).
- 6.4 **Reasonable assistance:** will provide all reasonable assistance to the Recipient in order to carry out the Project.
- 6.5 **No liability:** acknowledges and agrees that the Ministry will not be liable under any circumstances for any loss or damage that arises as a result of the Deliverables performed in connection with this Deed as the Ministry is merely facilitating the Grant to allow the Recipient and the Land Owner(s) to carry out the Project.

- 6.6 **Termination of Project:** acknowledges that the Recipient will be under no obligation to complete the remediation of the Property and/or the Ministry will be under no obligation to contribute funding in respect of the Property if:
- (a) reasonable access to the Contaminated Land on a Property is denied by the relevant Land Owner;
 - (b) the Land Owner is in material breach of this Deed and the breach remains unremedied for a period in excess of 10 days following notification by either the Recipient or the Ministry of such a material breach; or
 - (c) the Ministry provides to a Land Owner or the Recipient notice in accordance with clause 5.6 (Termination) or clause 5.7 (Termination by Notice).
- 6.7 **Reputations:** shall not, and use its best endeavours to ensure that its advisers, employees, contractors or any other persons do not, do anything that may attract adverse publicity or damage the reputation of or otherwise bring into disrepute, the CSRF, the Minister, the Ministry or the New Zealand Government.

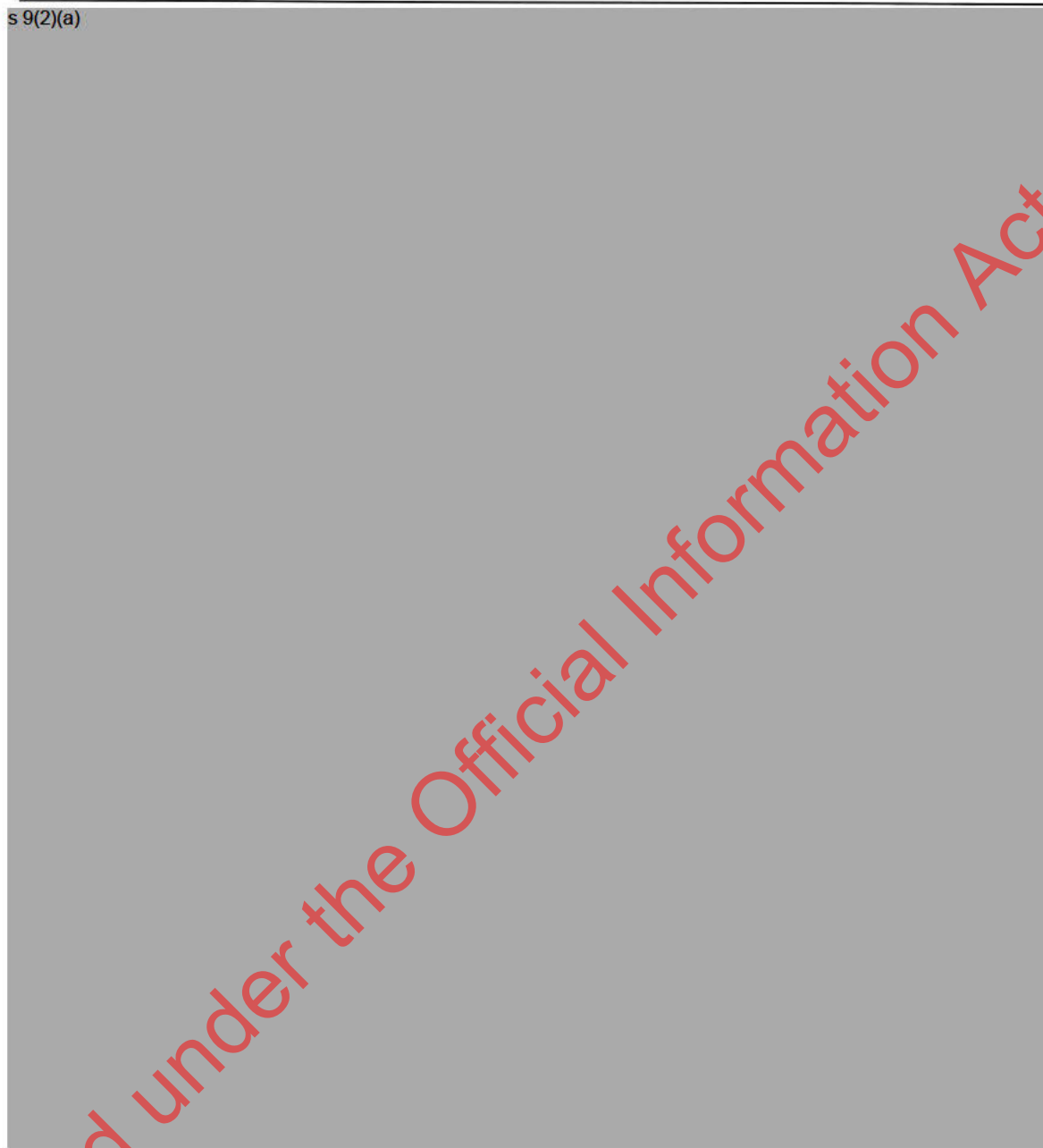
Section 7: Guarantor's Obligations
(If no Guarantor is specified in Part A of this Deed, the Guarantor's Obligations do not apply)

- 7.1 The Guarantor guarantees the performance of the Land Owner's obligations under this Deed.
- 7.2 If there is more than one Guarantor, their liability under this guarantee shall be joint and several.
- 7.3 As a separate obligation, the Guarantor must continually indemnify the Ministry, on demand, against any liability, loss, damage or expense the Ministry incurs as a result of the Land Owner failing to perform or observe any its obligations under this Deed.

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SCHEDULE 1: CONTAMINATED LAND

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SCHEDULE 2: REPORTING

- A. The Recipient must provide the following reports to the Ministry:
1. **Milestone Payment Form:** to be completed and given to the Ministry at the times, and with the information, required by the Ministry so that Grant payments can be properly processed.
 2. **Project Status Reports:** using the template set out in the Project Management Plan, at the frequency specified in the Project Management Plan and, if no period is specified, within 5 working days of the end of each month, that include:
 - (a) a description of the Deliverables carried out in relation to each Phase since the previous report;
 - (b) the names of the subcontractors who carried out the Deliverables in relation to each Phase;
 - (c) an assessment as to progress against the Project Management Plan;
 - (d) information on any Project tender process conducted in the previous month and how the Recipient has complied with clause 2.4(g) of Part C of this Deed;
 - (e) a review of the Project risk register and issues register, including amendments to risk identification, assessment, treatment and status;
 - (f) assessment of health and safety incidents and processes implemented and monitored;
 - (g) an outline of any issue arising during the month, the impact (if any) of those issues on the timing of the completion of each Phase, an explanation of significant variances, and any proposed corrective actions required;
 - (h) in relation to expenditure:
 - (i) the amount spent on each Deliverable and a reasonable breakdown of the expenditure;
 - (ii) the cumulative amount spent on each Deliverable against the Estimated Cost for that Deliverable including forecasts for future months; and
 - (iii) if requested by the Ministry, forecasts certified by a quantity surveyor approved by the Ministry confirming that a Deliverable can be completed within the relevant Estimated Cost;
 - (i) the latest version of the Project Management Plan as an attachment;
 - (j) any other information that the Recipient considers the Ministry should be informed about; and
 - (k) any other information reasonably requested by the Ministry.

The Recipient shall make each Project Status Report available on its website within 5 Working Days of completing that Project Status Report to the Ministry's reasonable satisfaction.
 3. **Phase Final Reports:** to be given to the Ministry as the final Milestone of the relevant Phase. The Recipient shall make the Phase Final Report available on its website within 5 Working Days of completing the Phase Final Report to the Ministry's reasonable satisfaction.
 4. **Ad hoc reports:** specific reports, to be promptly given to the Ministry on written request about any specific aspect of the Project.
 5. **Project Closure Report:** to be given to the Ministry as the final Milestone of the Project.
 6. **Financial Reports:** The Recipient shall:
 - (a) within three months of the end of each year commencing 1 July and ending on 30 June (a "Financial Year"), either separately or within a Project Status Report; and
 - (b) as a part of the Project Closure Report,

submit to the Ministry a financial report that relates to the Financial Year or full period of the Project (as applicable), each of which must include:

 - (c) the total amount of Grant received during the reporting period;
 - (d) the Estimated Cost for each applicable Deliverable in the reporting period, and the actual amount spent on each Deliverable and variance for the reporting period; and
 - (e) any other information reasonably requested by the Ministry.

- B. On request by the Ministry, the Recipient must provide any report described in this Schedule 2 to the Ministry in draft form for the Ministry's approval (not to be unreasonably withheld or delayed). If the Ministry does not approve the report, the Recipient must make such modifications as are reasonably required by the Ministry and resubmit the report to the Ministry to be approved (with this paragraph applying to any resubmitted report).

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SCHEDULE 3: AUDIT**Scope of audit**

Contaminated Sites Remediation Fund projects may be selected for an audit by the Ministry at the Ministry's sole discretion. An audit may take the form of a full technical, financial, compliance and/or health & safety audit, or a more informal assessment, of the Recipient and/or Sub-Recipient(s). The purpose of an audit is to check compliance with the terms and schedules of this Deed, the appropriate use of the Grant and/or reviewing the Recipient's ability to perform any obligations under or in connection with this Deed.

Audit requirements

The Ministry will inform the Recipient if an audit is to be carried out (**Notification of Audit**) and will seek an appropriate date and time for all Parties. The Recipient and Land Owner(s) must within three Working Days of the Notification of Audit agree a date and time. The date of the audit must be within 10 Working Days of the Notification of Audit. Audits will be carried out either by a fully qualified accountant or technical specialist who is independent of the Ministry or by Ministry staff. The Recipient must promptly provide or ensure the provision of adequate access, assistance and facilities for audit personnel as required by the Ministry during the hours of 8:00am and 5:00pm on Working Days.

Audit report

A report of the outcome of any audit may be available upon request.

Cost of audit

In the event that the audit reveals any misappropriation of the Grant or material discrepancies (particularly those related to Deliverables), the Recipient will be liable for the costs of an audit and any corrective action required as a direct result of the misappropriation or discrepancy, as well as the repayment of any misappropriated Grant monies.

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SCHEDULE 4: CHANGE CONTROL PROCESS

1. **Definitions:** For the purposes of this Schedule, the following words shall have these definitions unless the context requires otherwise:

"**Change**" means any amendment, deletion or addition to this Deed;

"**Change Control Register**" has the meaning given to it in paragraph 11 of this Schedule;

"**Change Request**" means a written request for a Change which shall be substantially in the form of Appendix 1 to this Schedule;

"**Further Information**" has the meaning given to it in paragraph 7;

"**Minor Budget Change**" has the meaning given to it in paragraph 3 of this Schedule;

"**Minor Delivery Change**" has the meaning given to it in paragraph 4 of this Schedule; and

"**Itemised Cost**" means an item of expenditure listed in the Budget that is, or is intended to be, paid for in whole or in part by the Grant.

2. **Changes:** All Changes must be made in accordance with paragraphs 5-10 of this Schedule, except where the Change is a Minor Budget Change or a Minor Delivery Change. Paragraph 11 of this Schedule applies to any Change (including a Minor Budget Change or a Minor Delivery Change).

Minor Changes

3. **Minor Budget Change:** Where a Change is solely in relation to the re-allocation of Grant from one Itemised Cost to another, and:

- (a) the Change does not result in an aggregate increase or decrease of 10% or greater to the relevant Project Costs as originally set out in the Budget at the Commencement Date (or when the Project Costs were otherwise first agreed and added to the Deed); and
 - (b) the total Grant is not affected or likely to be affected; and
 - (c) the Completion Date is not affected or likely to be affected,
- (a "**Minor Budget Change**"), the Recipient may make the change at the discretion of the Project Manager provided that the Recipient notifies the Ministry of the Change in the next applicable Project Status Report in accordance with Schedule 2 (Reporting) of the Deed.

4. **Minor Delivery Change:** Where a Change is solely in relation to the re-scheduling of a Milestone Date specified in the Project Management Plan and:

- (a) the Change does not bring forward or delay the Milestone Date by more than 1 calendar month from the relevant Milestone Date as originally set out in the Project Management Plan at the Commencement Date (or when the Milestone Date was otherwise first agreed and added to the Deed);
 - (b) the total Grant is not affected or likely to be affected; and
 - (c) the Project Completion Date is not affected or likely to be affected,
- (a "**Minor Delivery Change**"), the Recipient may make the Change at the discretion of the Project Manager provided that the Recipient notifies the Ministry of the Change in the next applicable Project Status Report in accordance with clause 4.7 (Keep Ministry informed) of Part C of the Deed and Schedule 2 (Reporting).

Change Control

5. **Change Request:** The Recipient or the Ministry may issue a Change Request Form at any time. The Change Request shall:

- (a) be substantially in the form of Appendix 1 to this Schedule;
- (b) if issued by the Recipient, include an impact assessment;
- (c) if issued by the Ministry require the Recipient to complete the impact assessment in the Change Request and return to the Ministry as soon as reasonably practicable and in any event within 10 working days of receiving the relevant Change Request.

6. **Impact assessment:** Each impact assessment shall be completed in good faith, be substantially in the form of Part 2 of Appendix 1 to this Schedule and include:
- (a) details of the proposed Change;
 - (b) details of the impact of the proposed Change on the Project, specifically:
 - (i) to the Deliverables and Milestones;
 - (ii) to the Project timeframes;
 - (iii) to the Recipient's ability to meet its obligations under the Deed;
 - (iv) to the costs being paid for by the Grant;
 - (v) include the costs of implementing the Change; and
 - (vi) any other information the Ministry may reasonably request.
7. **Further information:** If the Ministry reasonably considers that it requires further information regarding a proposed Change, then within 5 Working Days of receiving an impact assessment in a Change Request the Ministry shall notify the Recipient and detail the further information required. The Recipient shall then re-issue the relevant impact assessment to the Ministry as soon as reasonably practicable and in any event within 10 Working Days of receiving such a request. The Parties may repeat the process described in this paragraph until the Ministry is satisfied that it has sufficient information to properly evaluate the proposed Change ("**Further Information**").
8. **Right of approval:** Within 10 Working Days of receiving an impact assessment in a Change Request or within 5 Working Days of receiving Further Information under paragraph 7, the Ministry shall do one of the following:
- (a) approve the proposed Change, in which case the Change may come into effect in accordance with paragraph 9 of this Schedule; or
 - (b) reject the proposed Change, in which case the Ministry shall notify the Recipient in writing. The Ministry shall explain its reasons for rejection in writing, as soon as reasonably practicable following such rejection.
9. **Change authorisation:** Any Change proposed in a Change Request will not be authorised and the Recipient shall not implement any proposed Change until:
- (a) the Change Request is signed in accordance with the Ministry's Change authorisation and sign off procedure, as notified by the Ministry to the Recipient in writing from time to time; and
 - (b) if the Change:
 - (i) affects the total Grant;
 - (ii) affects the Completion Date;
 - (iii) amends the terms of the Deed (including to any Schedule); or
 - (iv) the Ministry otherwise requires (at its sole discretion),
 it must be signed and delivered as a deed by the duly authorised representatives of the Parties.
- For the avoidance of doubt, unless paragraph 9(b) applies, a Change Request for any Change(s) that solely relate to the Project Management Plan is authorised, and may be implemented, once the relevant Change Request is signed in accordance with paragraph 9(a).
10. **Costs:** The Recipient shall bear its own costs in relation to the preparation and agreement of each Change Request and Impact Assessment. For the avoidance of doubt, the Grant may not be used to fund such costs unless expressly agreed in writing by the Ministry.
11. **Change Control Register:** The Project Manager shall for the period of this Deed maintain a change control register, substantially in the form of Appendix 2 to this Schedule, documenting any and all Changes (the "**Change Control Register**"). The Change Control Register shall be attached to the Project Management Plan.

Appendix 1 – Change Request form template

s 9(2)(a) Change Request form				
PART 1: CHANGE REQUEST				
Project:		Deed #:		
Change Request #:		Requested By:		
Change Title:		Date:		
Full description of proposed Change (including reasons for the change):				
Details of any proposed alternative scenarios:				
Supporting Documents:	DOC # (Title and version) DOC # (Title and version)			
Change Request prepared By:	Name:			
	Role:			
	Signature:			
PART 2: IMPACT ASSESSMENT				
COSTS				
Total Costs Impact:	\$			
Project Budget Cost	Current Budget	Revised Budget	Net change	
Total Resource Cost	\$		Total Other Costs:	\$
Resources	Hours	Costs	Item	Costs
TIMELINE				
Total Timeline Impact:				
Project Task	Milestone	Current timeline	Revised timeline	
OTHER IMPACTS				

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Details of any other impacts to the Project:	
RISK ASSESSMENT	
Detailed Risk Assessment:	
Recommendation:	
Impact statement prepared By:	Name:
	Role:
	Signature:
PART 3: CHANGE AUTHORISATION	
Decision: (circle one)	Approve Approve with changes* Defer Decline
Comments: (must be completed if deferred (with deferral date) or declined)	
*Description of Change authorised (if different from above):	
Details of any related Changes required to Project Management Plan:	
Details of any related Changes required to other parts of Deed (subject to a formal Deed variation):	
Signed for and on behalf of the Secretary for the Environment by:	
Name:	
Role:	
Signature:	
Date:	
Signed for and on behalf of the Recipient by:	
Name:	
Role:	Project executive
Signature:	
Date:	

Appendix 2 – Change Control Register template

Hawford Road Change Control Register											
Minor Budget Changes						Minor Delivery Changes					
No	Date of Change	Title Change	of	Itemised Cost(s) affected	Updated PMP version	No	Date of Change	Title Change	of	Milestone Date(s) affected	Updated PMP version
1.						1.					
2.						2.					
3.						3.					
4.						4.					
All Other Changes											
No	Request Date	Requestor	Title of Request	Tasks and Milestones affected	Total Costs of change	Status					
1.											
2.											
3.											
4.											
5.											

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SCHEDULE 5: EXPENSE POLICY

The purpose of this expense policy is to provide the Recipient with guidance on what the Ministry considers to be reasonable travel-related expenses.

If the Recipient is eligible to claim travel-related expenses as indicated in this Deed, this policy applies unless the Deed expressly provides an exception to this policy. No travel-related expenses are payable by the Ministry if this Deed does not expressly provide for them.

Air Travel

The Ministry encourages non-flexible fares as often there is little or no difference between buying two non-flexible fares and paying for a fully flexible fare, hence making the risk of cancellation worthwhile. The Ministry encourages the purchase of the cheapest fares (unless there are valid reasons for not buying these). **International air travel is not covered by the Grant unless the Deed expressly states otherwise.** Where alternatives to travel are available, such as video conferencing or teleconferencing, please use these.

Travel expenses

Actual and reasonable expenses (on receipt) for meals and other incidental expenses while on out-of-town business for the purpose of the Project may be claimed.

We have indicated actual and reasonable (meals) as follows:

- Breakfast \$20
- Lunch \$20
- Dinner \$40

Alcohol purchases are a personal expense and therefore cannot be charged back to the Ministry as part of Travel expenses.

Accommodation

The Ministry will contribute up to \$160 per night (GST exclusive) for accommodation in New Zealand.

Taxis/parking

Taxi costs may be reimbursed if used as part of the Project. The Recipient must provide receipts for taxi fares and/or parking costs. If supporting documentation cannot be provided, the charge will not be reimbursed.

Phone calls

The Recipient should ensure the cheapest option is used for making calls. Personal calls are not covered by the Grant. Project related calls are reimbursed upon receipt of supporting documentation. Calls charged to hotel bills are often extremely expensive and should be avoided where possible.

Mini-bar

Mini-bar charges are a personal expense and therefore cannot be charged back to the Ministry as part of the Recipient's accommodation bill.

Use of private motor vehicle

The Recipient may use a private vehicle for business relating to the Project. Mileage may be claimed at the standard mileage rate for motor vehicles stated on the 'Mileage rate for self-employed people and reimbursing employees' page on the Inland Revenue website. Where travel is undertaken in a personal vehicle, the assumption is that the individual travelling is principally responsible for insurance coverage. The Ministry will not be liable for any costs incurred in the event of an accident under these circumstances.

SCHEDULE 6: PRINTED PUBLICATIONS

Acknowledgments

All publications must acknowledge that financial support has been received from **"the Contaminated Sites Remediation Fund, which is administered by the Ministry for the Environment."**

Disclaimer Clause

The following disclaimer must appear on the inside front cover of all publications supported by the Contaminated Sites Remediation Fund.

"The Ministry for the Environment does not necessarily endorse or support the content of the publication in any way."

Copyright Clause

All publications supported by the Contaminated Sites Remediation Fund must include the following clause relating to copyright:

"This work is copyright. The copying, adaptation, or issuing of this work to the public on a non-profit basis is welcomed. No other use of this work is permitted without the prior consent of the copyright holder(s)".

Or an alternate version is:

"Reproduction, adaptation, or issuing of this publication for educational or other non-commercial purposes is authorised without prior permission of the copyright holder(s). Reproduction, adaptation, or issuing of this publication for resale or other commercial purposes is prohibited without the prior permission of the copyright holder(s)."

Paper and Ink

You should consider using environmentally sound paper and inks when producing publications. Preferably use paper with a recycled content that is either elemental chlorine free or totally chlorine free. Specify vegetable inks or mineral-free inks wherever possible.

Electronic Copies of Written Material

On completion of the Project all written results must be provided in an electronic Word Format plus two printed copies. Where possible, please also publish electronic copies of written material to your website and provide us with the URL. We will link to these from our website.

Websites

It is recommended that any website, or content published on a website, developed using the Grant is developed in accordance with the NZ Government Web Guidelines to ensure it is accessible to a wide audience.

Some elements of the Guidelines are not applicable to non-government agency websites, but particular attention should be paid to section 6 "Delivering content" and section 7.4 "Forms" of the New Zealand Government Web Guidelines version 2.1 (see www.e-government.govt.nz/web-guidelines/).

Other aspects of the New Zealand Government Web Guidelines should be considered and followed where applicable and practical.

Information systems

It is recommended that any information system, including databases, developed using funds from this Deed observes the standards in the E-government Interoperability Framework (e-GIF). Following the e-GIF will allow the information system to more easily work together with systems in government agencies and other organisations that are following the e-GIF.

Any programmes, databases or spreadsheets must have instructions for their use, including the versions of software needed to run databases or spreadsheets, and the platforms on which the software will run. These instructions should be in the form of a short word file.

ANNEXURE 1: PROJECT MANAGEMENT PLAN

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Project Management Plan

s 9(2)(a)

Landfill

Phase 2 – Detailed Site Investigation

Date: 25 October 2017 V1.3

Document Control

Version Control


Version	Author	Description of Change	Date
0.1	Ministry for the Environment	Initial Document	07/07/2015
1.0	Environment Canterbury	Update document	30/06/2017
1.1	Ministry for the Environment	Update document	11/07/2017
1.2	Environment Canterbury	Update document	12/07/2017
1.3	Environment Canterbury	Update timeline	25/10/2017

Referenced Documents

Document Name	Date of Issue	Version
Environment Canterbury Scoping Study – s 9(2)(a) Results Tables and Maps	23/02/2017	1
Environment Canterbury Scoping Study – XRF labelled data	23/02/2017	1
CSRF Application, Environment Canterbury	31/03/2017	1
s 9(2)(a) List of Landowners	23/02/2017	1

Document Approval

Responsible for delivering the result

Signatory	Signature	Date
Davina McNickel Team Leader, Contaminated Sites		30/06/2017

Approved by: Project Sponsor

Signatory	Signature	Date
Stefanie Rixecker Director, Science		30/06/2017

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1. Introduction

1.1. Document Purpose

The purpose of this Project Plan (PP) document is to define the direction, scope and parameters of the s 9(2)(a) Landfill project and to detail the project management processes and activities which will direct the project during delivery. This PP will act as a base document against which the Project Steering Group and Project Manager can assess progress, project issues and the ongoing viability of the project throughout its lifecycle.

This PP covers the s 9(2)(a) Landfill project which consists of Phase 2: Detailed Site Investigation.

1.2. Background

The s 9(2)(a) Landfill site is located in the Christchurch suburb of s 9(2)(a), bounded by s 9(2)(a). The land appears to have been filled around the early 1900's as the filling pre-dates houses that were built in the area in the 1940's. Key contaminants of concern are heavy metals and polycyclic aromatic hydrocarbons (PAHs). Lead, arsenic, chromium, copper, and zinc present well above expected background concentrations in surface soils and to depths up to at least 1.5 m below ground level. Lead contamination is the greatest concern, with concentrations at the site exceeding the residential soil contaminant standard of 210 ppm by a factor of up to 28 times.

The contamination was not discovered until after the 2010/2011 earthquakes when fill material was found during earthquake repair works for a number of houses in the area. The area was not identified in Environment Canterbury's records (Listed Land Use Register (LLUR) prior to receiving the reports. The LLUR details would not have been on any LIMs provided to residents by the Christchurch City Council when residents purchased their properties. All properties within the footprint of the site are residential properties with houses and gardens, the surrounding land is also used for residential purposes. The Heathcote River and Jackson's Creek are located around s 9(2)(a) of the site respectively.

The site has been subject to a scoping study by Environment Canterbury, which included surface sampling using a portable XRF analyser. The study was undertaken to determine the lateral extent of the contamination. A number of properties have had detailed site investigations undertaken on them for insurance purposes. However, these were limited in scope and were largely for characterising the soil for disposal options, rather than assessing risks to human health. The lateral and vertical extent of the contamination at the site is not fully understood.

1.3. Project Management Plan Development Consultation

The Project Manager has developed the PP with a number of key stakeholders and interested parties. The PP has been agreed with the key stakeholders and was agreed approved by the Project Steering Group.

Below is the list of parties, who have been involved in PP development consultation.

Party	Comments (if any)
Ministry for the Environment (MfE)	Funder
Environment Canterbury	Project Management
Christchurch City Council	Financial Contribution

Project Plan

s 9(2)(a)

Landfill Phase 2

Landowners	Affected parties
Canterbury District Health Board	Interested Party
Consultant	Undertake detailed site investigation

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2. Project Definition

2.1. Project Objectives

This s 9(2)(a) Landfill project has the following primary objectives:

Detailed Site Investigation, Phase 2 objectives:

1. The assessment of the s 9(2)(a) Landfill is undertaken in manner that minimises any risk from the contaminants present to site workers and owner/occupiers.
2. Determine the lateral and vertical extent of the s 9(2)(a) Landfill and characterise the contaminants within the fill materials.
3. Quantify the risk presented to human health and the environment from contamination associated with the historical landfilling activities.
4. Provide landowners and property occupants with information on the extent and severity of the contamination at their property.

2.2. Scope

The following assumptions were made in respect to the project's scope:

- It is assumed that the project will be completed within the funding made available for the project
- It is assumed that the project will be completed within the timeframes as set out in Section 6 of this document entitled "Project Schedule"
- Further applications to the fund will be made if future stages of works at the site are required.

Project Lifecycle Stages

The project stages are as follows:

The following tables outline project in-scope and out-of-scope activities.

In Scope Items
<p>Hawford Road Landfill, Phase 2</p> <ul style="list-style-type: none"> • Milestone 1: The completion of a Detailed Site Investigation by a specialist contractor DSI report. <ul style="list-style-type: none"> ○ Development of a conceptual site model ○ Sampling plan ○ Fieldwork ○ Laboratory analysis and reporting ○ Preliminary identification and indicative assessment of remedial options

Out of Scope

The following are excluded from the scope of works

Phase 2

- Full detailed assessment of remedial options. Due to the complexities of the site with approximately 23 landowners, a future CSRF application will be made for a full assessment of remedial options if required.
- Remediation of any contaminated land.
- Assessment of any environmental effects on nearby watercourses

2.3. Key Performance Indicators (KPIs)

Phase 2 KPIs

1. The Detailed Site Investigation will be undertaken in accordance with the Project Health and Safety Plan.
2. Completion of a Detailed Site Investigation as per the timings of the project schedule (31/01/2018). This will be measured by:
 - Development of a specific health and safety plan for the detailed site investigation that identifies specific hazards and appropriate mitigations and is consistent with the Environment Canterbury health and safety plan by 04/12/2017. Risk register is kept up to date throughout the project.
 - The completion of a DSI report (including a conceptual site model, sampling plan, fieldwork, laboratory analysis, and indicative assessment of remedial options) in accordance with the MfE Contaminated Land Management Guidelines 1-5 (CLMG 1-5). The DSI report will identify the lateral and vertical extent of the contamination, risks to human and environmental receptors, and assess the requirement for further investigation/remediation to address the risks identified by 31/01/2018.
 - The Detailed Site Investigation will be completed within forecasted budget s 9(2)(b)(ii)
3. The DSI report will compare contaminant results to applicable soil contaminant standards and guidelines by 31/01/2018.
4. Landowners are provided with a report detailing the results for their individual property by 21/01/2018 which is presented in a form that allows landowners to easily understand the findings and make them aware of extent and nature of the contamination and the potential exposure risks of the site. If relevant, the findings of the report should be shared with property occupants.

2.4. Expected Project Benefits

The project has identified a number of potential benefits to be achieved post project implementation. The table below outlines these benefits.

The key benefits of the project are based on:

Benefit Type	Benefit Description	Measure	Source of measure
Social/Cultural	Enhanced relationship between Christchurch City Council and Environment Canterbury	Joint approach to communications and liaison with community	Works and report satisfies both Environment Canterbury and

Benefit Type	Benefit Description	Measure	Source of measure
		throughout the project	Christchurch City Council requirements
Environmental/Human Health	The occupants of the houses, and any future occupants, will be aware of the status of the soil at their property	DSI report is provided to landowners and local authorities	Local authority records will retain information and reports of works completed
Environmental/Human Health	The investigation will inform the management or remediation of the landfill	The DSI report is robust and will inform future stages of work	Report satisfies both Environment Canterbury and MfE requirements

2.5. Quality Assurance Processes

The table below identifies key Quality Assurance processes for the project and the methods by which success will be measured. These are the components the project needs to satisfy in order to be considered successful by its key stakeholders and end customers.

Critical Success Factor	Acceptance criteria	Date due	Responsible person
DSI meets CLMG 1-5 requirements	A suitably experienced and reputable consultant is engaged to undertake the DSI. The report is consistent with Contaminated Land Management Guidelines No's 1 & 5.	24/11/2017	Conor Parker
The cash cost of the project does not exceed s 9(2)(b)(ii)	The project is managed in a way that ensures it is kept on budget	31/01/2018	Conor Parker
DSI report is submitted in accordance with the project schedule	All site works are completed and report is submitted to Environment Canterbury by 31/01/2018	31/01/2018	Conor Parker

2.6. Key Stakeholders

Stakeholders are defined as affected or interested parties. The following groups have been identified as the key stakeholders for the project.

Stakeholder	Description/roles	Engagement Strategy
Landowners/property occupants	The landowners were unaware of the contamination in the soil when they bought their properties. Partnership will strengthen with Environment Canterbury and Christchurch City Council as works are undertaken to assess the extent and severity of the contamination.	The landowners and property occupants will be involved throughout the process. Individual property results will be shared with the relevant landowners
Christchurch City Council	Partnership will be strengthened with Environment	Sharing of final report

Project Plan

Hawford Road Landfill Phase 2

	Canterbury as the two bodies communicate and cooperate with each other on the project. Christchurch City Council will contribute ^{s 9(2)(b)(ii)} towards this phase of the project.	and briefing to key CCC staff at the conclusion of the project.
Environment Canterbury	Environment Canterbury has performed an initial scoping study of the area. Partnership will be strengthened with the Christchurch City Council and the wider community as Environment Canterbury demonstrates its ability to be proactive and supportive in contentious contaminated land situations. Environment Canterbury will contribute ^{s 9(2)(b)} towards this phase of the project.	Environment Canterbury is the project manager so responsible for all aspects of the project implementation.
Canterbury District Health Board	The Canterbury District Health Board have been involved in initial conversations and meetings with landowners, and have provided advice relating to the health implications on living on contaminated soil. Further advice will be sought following the completion of the detailed site investigation. Partnership will be strengthened as Environment Canterbury and the Canterbury District Health Board communicate and cooperate with each other on the project.	Sharing of final report and briefing to key CDHB staff at the conclusion of the project.
Ministry for the Environment	Active Monitoring Funding up to ^{s 9(2)(a)}	Reporting, Milestone claims.

2.7. Key Messages

Outline the key messages that the project needs all stakeholders and audiences to understand. There should be no more than three to five.

The key messages for this project are:

- The ^{s 9(2)(a)} Christchurch was subject to landfilling in the 1900s. The source of the fill is unknown, but initial investigations have found concentrations of lead, arsenic, chromium, copper, zinc, and asbestos that exceed residential soil guideline values for the protection of human health.
- The landowners were unaware of the contamination in the soil when they bought their properties. The landfill only came to the attention of Environment Canterbury following the submission of detailed site investigations for earthquake repair works in 2015.
- Environment Canterbury has commissioned a detailed site investigation (DSI) to be undertaken by a suitably qualified and experienced practitioner. The purpose of the DSI is to determine the lateral and vertical extent of the ^{s 9(2)(a)} landfill and characterise any contamination within the fill materials.
- The DSI report will detail the extent and severity of the contamination at the site, which will assist with the assessment of health risks and the development of remedial options.
- Currently landowners have been advised on measures they can take to reduce their exposure.

2.8. Risk Assessment and Management

The management of the risk associated with this project is an essential element of the overall success. If risks are not identified and managed appropriately, time and financial costs may

increase and at worst, result in damage to property and people. This will have a direct impact on the project and may also have an impact on perceptions of the project's stakeholders.

The process for continuous identification, communication and management of risks throughout the project life is as follows:

- a. The identification and assessment of project risks by project manager and the appointed consultant
- b. Creation of a Project Safety Plan prior to site works by the Project Manager and checked by the Environment Canterbury Health and Safety Advisor and Project Executive.
- c. Daily site assessments by consultants prior to works
- d. Erosion, sediment and dust controls
- e. Appropriate Personal Protective Equipment, signage and fencing
- f. Maintenance of a Project Risk and Issues Register/s
- g. Regular communication with the landowner/property occupants, Environment Canterbury, Christchurch City Council, and Ministry for the Environment.

Risks Reporting and Escalation

The Project Manager will be responsible for risk recording, reporting and escalation processes in accordance with the Council's overall risk management framework.

The initial project risks are recorded in the Risk Register attached as Appendix 1. The Risk Register is a living document and the latest updates can be obtained from the Project Manager or found in Environment Canterbury's Records Manager under IN7C/3738. The Risk Register will be reviewed at regular intervals/project meetings by the Project Team to ensure that risks are being monitored and managed.

2.9. Issues Management

The Project Manager will be accountable for the management of issues with the appropriate owners across the project and stakeholder groups. An Issues Register will be maintained by the project manager.

Prompt identification and resolution of project issues is a key to successful project delivery. All issues identified by the project team or other stakeholders will be recorded in the Issues Register. The following details for all issues identified will be included:

- issue No.
- full description
- issue rating and priority (H/M/L)
- impact of the issue
- resolution actions required
- resolution date
- status

The project manager will assign an owner for each issue. The owner of the issue must have the appropriate resource and fiscal delegations to be able to implement any actions required to address the issue.

During the course of the Project it is likely that a number of identified risks will materialise and planned mitigation, transfer or acceptance activities will be put in place. Any risks that have materialised will be tracked by the project as an issue.

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3. Project Milestones

The Project Manager is responsible for monitoring the project's progress against its detailed schedule.

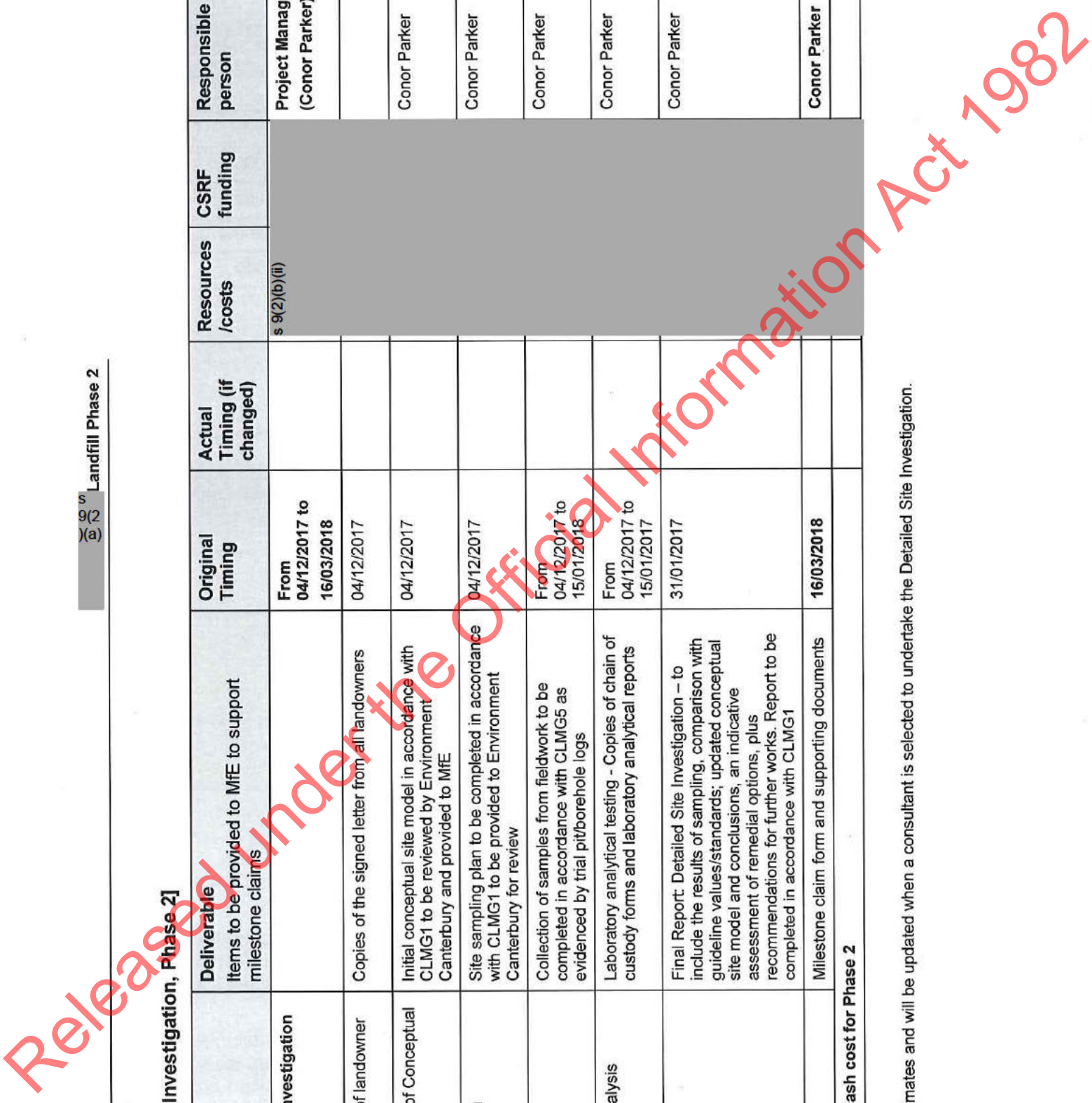
The table below outlines the high level planned completion dates for each phase of the project. The Project Manager will direct and co-ordinate the individual tasks within the scope of the project ensuring that agreed milestones are met.

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[Detailed Site Investigation, Phase 2]

Milestone	Deliverable Items to be provided to MFE to support milestone claims	Original Timing	Actual Timing (if changed)	Resources /costs	CSRF funding	Responsible person
1. Detailed Site Investigation		From 04/12/2017 to 16/03/2018		s 9(2)(b)(ii)		Project Manager (Conor Parker)
1.1 Confirmation of landowner approval	Copies of the signed letter from all landowners	04/12/2017				
1.2 Development of Conceptual Site Model	Initial conceptual site model in accordance with CLMG1 to be reviewed by Environment Canterbury and provided to MFE	04/12/2017				Conor Parker
1.3 Sampling Plan	Site sampling plan to be completed in accordance with CLMG1 to be provided to Environment Canterbury for review	04/12/2017				Conor Parker
1.4 Fieldwork	Collection of samples from fieldwork to be completed in accordance with CLMG5 as evidenced by trial pit/borehole logs	From 04/12/2017 to 15/01/2018				Conor Parker
1.5 Laboratory Analysis	Laboratory analytical testing - Copies of chain of custody forms and laboratory analytical reports	From 04/12/2017 to 15/01/2017				Conor Parker
1.6 Reporting	Final Report: Detailed Site Investigation – to include the results of sampling, comparison with guideline values/standards; updated conceptual site model and conclusions, an indicative assessment of remedial options, plus recommendations for further works. Report to be completed in accordance with CLMG1	31/01/2017				Conor Parker
Milestone claim	Milestone claim form and supporting documents	16/03/2018				Conor Parker
Estimated total cash cost for Phase 2						

* All costs are estimates and will be updated when a consultant is selected to undertake the Detailed Site Investigation.



3.1. Expected costs

Expected costs are outlined in the table below:

Description	In-kind	Cash
Detailed Site Investigation – Phase 2		
Environment Canterbury	s 9(2)(b)(ii)	
Christchurch City Council		
CSRF - funding approved up to		
Total Detailed Site Investigation Phase 2 project cost		
Total CSRF contribution for Phase 2 up to		

*Based on Environment Canterbury's charge out rate of s 9(2)(b)(iii) per hour.

3.2. Dependencies and assumptions

The project has identified key dependencies which have the potential to impact project delivery. Dependencies are documented in the table below.

Dependency	How this will be managed	Person responsible for monitoring
The area to be investigated will be limited to those where Landowner and property occupants' cooperation has been agreed.	Keep landowners and occupants up to date with works and reporting schedule	Conor Parker
Consultants will be available in a high demand, rebuild economy	Early engagement of consultants, Timelines and budgets for works identified before works commence	Conor Parker
The weather will be amenable to site works	Field task timelines will be overestimated to allow for unforeseen delays.	Conor Parker

3.3. Constraints

The project has identified the following constraints which need to be considered by the project and which may impact on the project's ability to deliver against its planned timeframes.

- Consultant access to site. Access to individual properties is dependent on agreement with the landowner/property occupiers. Environment Canterbury will consult with landowners and property occupiers prior to appointing a consultant, to ensure that access is available when a consultant is appointed.
- Access to all areas of the site is limited. Access may be restricted in certain areas due to buildings covering the soil, or due to health and safety issues involved in accessing land. The sampling plan will investigate options to ensure the sampling undertaken appropriately represents the site's exposure area.
- Accidental discovery of unknown contamination presents an unacceptable risk for future works to be undertaken until mitigated or removed. An unexpected discovery protocol is to

be developed prior to commencement of physical works to ensure that the project can continue with minimal delays and cost impacts.

3.4. Project Change Management

Changes will be required to follow the change management process. All variations to the deed will be arranged by Environment Canterbury with the Ministry in accordance with the Deed of Funding. Changes must be advised by the Project Manager.

Any changes that are affecting the work programme budget or timeline agreed in the deed must have to be communicated to the Ministry along with the Request for Variation Form (to be obtained from the Ministry). Request for Variation Form shall be approved by Environment Canterbury's Project Sponsor before being submitted to the Ministry.

3.5. Project Reporting

Project reporting is set at different levels. These are as follows:

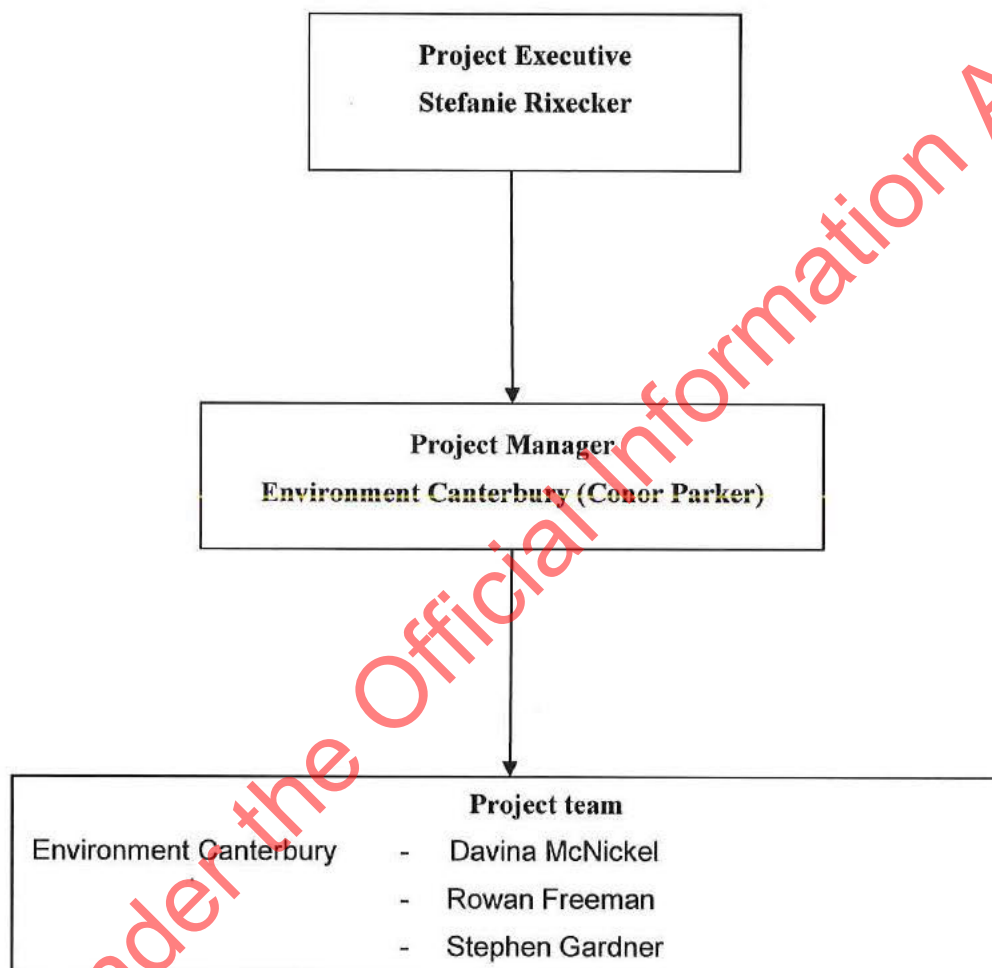
Target audience	Type of reporting	Purpose	Timing
Consultants, project Advisors, Landowners/ Property occupants/MfE	Project Management Plan	Clarification of project purpose, roles and responsibilities	Approved document by 13 September 2017
Consultants/ Landowners/ Property occupants/MfE	Confirmation of engagement of consultant	Report on progress in engaging a consultant, and likely timeframe for investigation works	24 November 2017
MfE	Status Communication	To provide regular updates to the MfE regarding work under the CSRF deed.	Weekly progress email of meeting minutes/memo's, regarding timing/budget, and when required for any important events.
Landowners/ Property occupants	Technical reports	To provide detailed site investigation report and recommendations for future work	31 January – 15 February 2018
Territorial Authorities and MfE	Technical reports	To provide detailed site investigation report and recommendations for future work	31 January – 15 February 2018
MfE	Project Closure Report	Report on the success of the project when considering all milestone deliverables, evaluation of the project objectives, identify any lessons learnt.	By 16 March 2018

Other reports might include risks, issues, change requests, or specific reports as directed by the Project Sponsor.

4. Project Organisation & Structure

4.1. Project Structure

To ensure strong governance and project control the following structure has been put in place for the project.



It is the responsibility of the Project Manager to keep the Project Executive informed. A weekly meeting regarding health and safety, timeframes and budget will be held with the Contaminated Sites Team Leader and minutes will be kept. These minutes will be provided to the Project Executive and the Ministry for the Environment.

4.2. Project Team

The project is managed overall by the Project Manager.

The table below summarises the project team roles and the key responsibilities.

Role	Who	Key Responsibility
Project Manager	Conor Parker	Project planning, contractor tendering, report preparation, liaison with MfE and landowners

Project Plan

s 9(2)(a)

Landfill Phase 2

Project Executive	Stefanie Rixecker	Assume responsibility for delivery of the benefits and success of the project.
Project team members	Davina McNickel Rowan Freeman Stephen Gardner	Assist with project planning, contractor tendering, report preparation, liaison with MfE and landowners
Consultant	Consultant to be arranged	Preparation of DSI

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5. Evaluation

Project Evaluation is a step-by-step process of collecting, recording and organizing information about project results, including short-term outputs (immediate results of activities, or project deliverables), and immediate and longer-term project outcomes (changes in behaviour, practice or policy resulting from the project).

5.1. Evaluation of milestone

The table will help to evaluate and measure the successful implementation of each milestone

Evaluation of milestones		
Milestone 1 – Detailed site investigation	Measure	Source of measure
1.1 Development of Conceptual Site Model	An initial Conceptual Site Model acceptable to Environment Canterbury officers	A Conceptual Site Model developed in accordance with CLMG 1 & 5 to be provided to Environment Canterbury prior to DSI works commencement
1.2 Sampling plan	A Sampling Plan to be approved by Environment Canterbury	Completion of a DSI sampling plan developed in accordance with CLMG 1 & 5 and is provided to Environment Canterbury
1.3 Fieldwork	A walk over survey of the site to identify sampling locations Sampling in accordance with the approved sampling plan	Evidence of field notes and photographs from site works to be included in the DSI report Chain of custody forms to be included in the DSI report
1.4 Laboratory analysis	Laboratory analysis provides accurate results that reflect the actual concentrations of contaminants in the soil at the site	Laboratory analysis to be undertaken by an IANZ accredited laboratory. Laboratory reports provided in DSI report. Provision of laboratory analysis in Milestone Report
1.5 Reporting	Report completed in accordance with CLMG 1 and accepted by Environment Canterbury and MfE.	A detailed site investigation report prepared in accordance with CLMG 1. The report details the following: <ul style="list-style-type: none"> • Updated conceptual site model • Sampling plan including locations and methodologies • Location, extent and concentration of any contaminants that may present a risk to site occupants and future landowners • Appropriate contaminant standards • Assessment of any potential risk to

Evaluation of milestones		
		<p>landowners/site occupants</p> <p>The report is to include indicative recommendations for any remedial works that would be required to ensure that the land is suitable for ongoing residential use</p>

5.2. Evaluation of project objectives

Evaluation of project objectives will help to determine whether the objectives and the benefits of the project have been met.

Complete the table below. Each of the "SMART" objectives listed in the section 2.1 Project Objectives must have a corresponding row in the table.

Evaluation of project objectives			
Objective	Key performance indicator (KPI)	Source of measure	Baseline information
<p>1. The assessment of the s 9(2)(a) Landfill is undertaken in manner that minimises any risk from the contaminants present to site workers and owner/occupiers.</p>	<p>All works undertaken in accordance with the site health and safety plan.</p>	<p>Health and safety items recorded in meeting minutes and project reports. Health and safety audits, corrective actions identified. Accidents register.</p>	<p>Project health and safety plan</p>
<p>2. Determine the lateral and vertical extent of the s 9(2)(a) Landfill and characterise the contaminants within the fill materials.</p>	<p>The completion of a DSI report (including a conceptual site model, sampling plan, fieldwork, laboratory analysis, and indicative assessment of remedial options) in accordance with the MfE Contaminated Land Management Guidelines 1-5 (CLMG 1-5). The DSI report will identify the lateral and vertical extent of the contamination, risks to human and environmental receptors, and assess the requirement for further investigation/remediation to address the risks identified.</p> <p>Detailed Site Investigation will be completed within forecasted budget</p>	<p>The DSI and report to be completed in accordance with CLMG 1&5 to assess the risk to human health and environmental receptors and to identify the need for further investigation/remediation.</p> <p>Milestone claim form to be submitted to MfE on completion of milestones.</p> <p>Site Closure Report completed by (16/03/2018)</p>	<p>Limited detailed site investigations have been completed for individual properties. An Environment Canterbury scoping study identified surface contamination above residential soil contaminant standards at the site.</p>

Evaluation of project objectives			
	s 9(2)(b)(ii)		
3. Quantify the risk presented to human health and the environment from contamination associated with the historical landfilling activities.	The DSI report will compare contaminant results to applicable soil contaminant standards and guidelines by 31/01/2018.	The DSI and report to be completed in accordance with CLMG 1&5 to assess the risk to human health and environmental receptors and to identify the need for further investigation/remediation.	Limited detailed site investigations have been completed for individual properties. An Environment Canterbury scoping study identified surface contamination above residential soil contaminant standards at the site.
4. Provide landowners and property occupants with information on the extent and severity of the contamination at their property.	Landowners are provided with a report detailing the results for their individual property by 15/02/2018.	Individual reports are provided to landowners and property occupants detailing the results for their individual property.	Landowners have been provided with preliminary reports and community meetings have been held outlining their soil results and the CSRF process.

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6. Project Schedule

For a full-scale project, the project schedule will typically be a Microsoft Project Plan, and normally displayed as a Gantt chart. The project schedule will be reviewed at the beginning and end of each of the project phases.

01/07/2017 – 13/09/2017	Project Management Plan Approval
30/10/2017 – 20/11/2017	Tender for consultants
20/11/2017 – 04/11/2017	Engage consultant
4/12/2017 – 22/12/2017	Undertake DSI works
31/01/2018	DSI Report due
16/03/2018	Closure report to MfE

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Appendix 1: Risk Assessment Register

This is a live document and will be held separately to the Project Management Plan in the Project Health and Safety Plan that will be developed with the consultant.

Risk No.	Potential risk	Level of risk	Impact on project	Consequence on project	Strategy to mitigate
1	A Health and Safety incident occurs during investigation works injuring or harming people	Low	Project delayed as incident is attended to, potential for long delay if the incident is serious	Project is delayed while Worksafe investigation is undertaken	Health and safety plan created by consultant. Monitoring and auditing according to the health and safety plan
2	Property or services damage from works	Low	Financial loss due to damage and associated repair works. Loss of faith in Environment Canterbury from site owners	Project is delayed while repairs are made. Increased monetary cost	Ensure consultant follows the provisions in the Health and Safety Plan, and works are discussed with the landowner prior to investigations starting
3	Change in project parameters/consultants	Low	Project is delayed while new parameters are accommodated/consultants sourced. Increased monetary cost	Project delays while sourcing replacement consultant	Contracts from chosen consultant
4	Lack of community/landowner engagement and cooperation	Low	Project is delayed while access is negotiated. Some properties are unable to be sampled	A full lateral and vertical assessment of the landfill is unable to be completed	Engage landowners before consultant is appointed to ensure access is available
5	Negative media coverage of the project	Medium	Loss of faith in Environment Canterbury and Christchurch City Council from homeowners	Project may be delayed; a full lateral and vertical assessment of the landfill is unable to be completed	Create a communications plan for media and homeowner enquiries.

ANNEXURE 2: Land Owner Agreement Form

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s 9(2)(a)

Landfill Soil Testing Sampling Consent Form

I grant permission to the representative(s) of Environment Canterbury to enter my property, located at the address below, for the purpose of collecting soil samples for testing; and for my contact details to be disclosed to the representative to arrange a suitable time for sample collection.

Address of Property (please print clearly)

Contact details

NAME

Please tick one: PROPERTY OWNER OCCUPIER/TENANT

Phone

(day/eve/mob.)

Email

Address for communication (if different from above)

By signing this form, I also acknowledge and agree that the Ministry for the Environment (part funding the Project) will not be liable under any circumstances for any loss or damage that may arise as a result of the s 9(2)(a) landfill project carried out by Environment Canterbury.

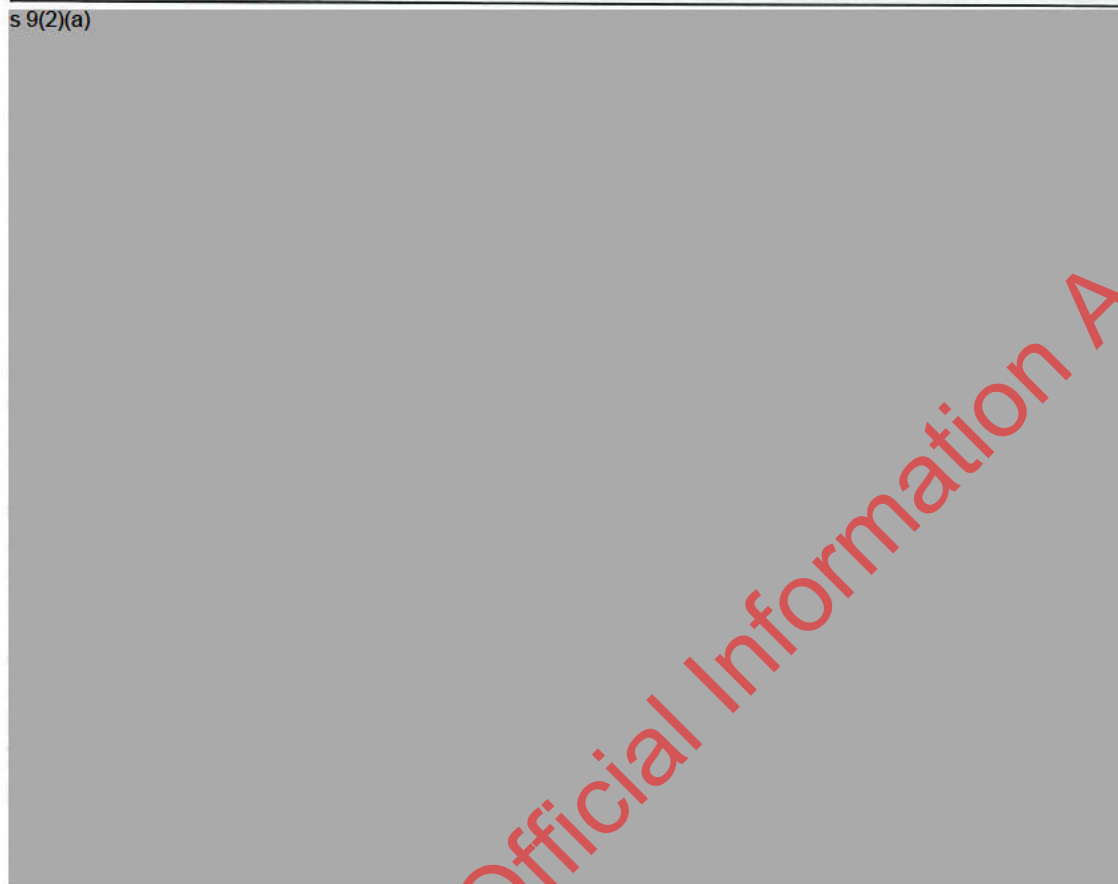
SIGNATURE _____

Date _____

If you are happy to give permission for soil samples to be taken from your property, please sign this consent form and return it using the freepost envelope supplied, or scan it back to us by email at: ecinfo@ecan.govt.nz

ANNEXURE 3: THE PROPERTY

s 9(2)(a)




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EXECUTION

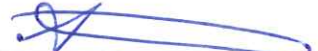
SIGNED as a deed on: 24 November 2017

The date that the Deed is signed is the date at which both parties have signed the Deed i.e. the date the final party signed the Deed. This date must be handwritten on both original copies of the Deed by the party who signs the Deed last.

Signed and delivered as a deed by Shaun Lewis,
Director, Mana Honohono
for and on behalf of the **Ministry for the
Environment**


Signature
24/11/2017
Date

In the presence of:

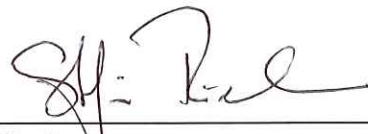

Witness Signature

Kim Wepasnick
Witness Name

Policy Analyst
Witness Occupation

23 Kete Sheppard Pl. Wellington
Witness Address

Signed and delivered as a deed on behalf of the
Recipient by:


Signature

In the presence of:


Witness Signature

Michelle Chung
Witness Name

PA Director, Science
Witness Occupation

200 Tam Street, Christchurch
Witness Address
8140.

Dr. Stefanie Rixecker, Director Science
Print Full Name
(For a Local Authority specify Description
Director/Authorised Signatory)

Date

Signature

Print Full Name
(For a Local Authority specify Description
Director/ Authorised Signatory)

Date

[Under the Local Government Act 2002, a Local Authority is a "body corporate" (section 12). The Property Law Act 2007 section 9(3)-(4) sets out the requirements for a body corporate to sign a Deed. This document must be executed in accordance with the enactment forming the Regional Council, District Council or any Constitution for that entity, or otherwise by two directors.]

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16 December 2019

Graham Aveyard
Environment Canterbury
PO Box 345
Christchurch 8140

Tēnā koe Graham

Decision on request for 100% funding from the Contaminated Sites Remediation Fund for ^{s 9(2)(a)} Landfill Remediation works

Thank you for your letter received on 6 September 2019, requesting the Ministry reconsider its decision regarding funding from the Contaminated Sites Remediation Fund (CSRF) for the ^{s 9(2)(a)} Landfill Remediation project. As previously advised on 11 September the Minister for the Environment is responsible for decisions regarding funding from the CSRF.

We passed your request and the letters of support from Canterbury District Health Board and Christchurch City Council onto the Minister for his consideration. The Minister has considered your request and determined that his existing funding offer is appropriate. The funding offer is consistent with the CSRF's assessment criteria and is reflective of the local, regional and national benefits gained. The Minister has, therefore, declined your request for an increase to the CSRF funding for the ^{s 9(2)(a)} Landfill Remediation project.

We understand that you will need to discuss this letter with your stakeholders. However, the CSRF is an annual appropriation and we need to commit the funding to your project or reallocate it to other high-ranking priority projects that are awaiting decisions on CSRF funding. If you intend to proceed with your project, please reconfirm your commitment within four weeks and follow the Stage 2 funding process's requirements and timeframes, outlined in our offer of funding letter dated 16 April 2019.

If you have any questions, or need any assistance with the Stage 2 funding process, please contact Carmel Mangan on 022 010 3793 or Bruce Croucher on 022 592 2826

Nāku iti noa, nā



Scott Priestley
Kaiwhakahaere - Manager, Hono Tātaki - Resource Efficiency & Innovation



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Memo

Date	21 March 2017
To	Brodie Young
CC	
From	Davina McNickel

Environment Canterbury contribution towards testing costs at

s 9(2)(a)

The soil sampling we have done at t^{s 9(2)(a)} landfill has shown that more testing is necessary to understand the extent of contamination present so that a solution can be identified. The cost of this work has been estimated s 9(2)(b)(ii) and with contingency applied it is likely costs could increase to s 9(2)(b)(ii). We are preparing an application to the Ministry for the Environment's contaminated sites remediation fund (due 31st March) asking for s 9(2)(b)(ii) to conduct that work. Part of our discussion with the landowners was that both Christchurch City Council and Environment Canterbury would agree to put forward funds to supplement any successful bid for assistance from the fund.

This memo formalises our recent conversation where you confirmed that Environment Canterbury are able to contribute s 9(2)(b)(iii) for additional testing s 9(2)(a) if the funding bid is successful. Christchurch City Council have been asked to commit the same amount. If this is not the case please let me know as soon as possible.

Kind regards



Davina McNickel
Team Leader Contaminated Sites

APPROVED.



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Contaminated Sites Remediation Fund

Application form for project funding

Funding Round: April 2017

Financial year: 2017

Council name: Environment Canterbury

Project name: s 9(2)(a) [redacted] | Landfill Investigation

Phase/s: Detailed Site Investigation

Official Information

Important: Information presented to the Minister for the Environment or the Ministry for the Environment is subject to disclosure under the Official Information Act 1982 (OIA). Certain information may be withheld in accordance with the grounds for withholding information under the OIA. Further information on the OIA is available at www.ombudsmen.parliament.nz.

Information held by the Minister and Ministry may have to be released under the OIA in response to a request from a member of the public (or any other body) for that information. If you wish to provide sensitive information to the Minister or Ministry that you do not want released, it is recommended you consult with the Ministry as to whether the information is necessary for the application, and whether there may be grounds in the OIA for withholding the information. For instance, if release of the information would disclose a trade secret, or be likely to unreasonably prejudice the commercial position of the person who supplied or who is the subject of the information, then there may be grounds to withhold the information. The Ministry will endeavour to contact you to discuss an OIA request relating to your application if one is received, and what the implications of releasing your information are.

The grounds for withholding must always be balanced against consideration of public interest that may justify release. Although the Ministry does not give any guarantees as to whether information can be withheld under the OIA, it may be helpful to discuss OIA issues with the Ministry in advance, if information provided with an application is sensitive.

Introduction

This application form is for funding proposals to the Ministry for the Environment's Contaminated Sites Remediation Fund (CSRf).

It is important to complete all fields in this application form. If the application is successful, the information you have provided will be used in the development of the funding deed.

It is preferable to complete this application form electronically, and submit it by email. Move between fields by using the mouse, or pressing the ↑ and ↓ keys on your keyboard. You may cut and paste from other documents for questions that allow for longer responses (more than 50 words). Note that some of the funding calculations will automatically be done for you.

If you need help to complete the application form, refer to the guide in the first instance. For any further information, email CSRfapplication@mfe.govt.nz, or phone 0800 499 700. If you need an additional copy of the application form and guide, phone or email the Ministry and we will send you a copy.

Please read the *Contaminated Sites Remediation Fund Guide for applicants for project funding* (the guide) before completing this application form.

When your application is complete

The deadline for completed application forms to be received by the Ministry is the last working day of March or September, depending on the funding round. We encourage you to submit your completed application form well ahead of the deadline, as we are unable to accept late applications. We are also unable to assess incomplete applications, so it is important you provide all the required information.

All applications must be completed using this application form.

Email your completed application form and supporting documentation to CSRfapplication@mfe.govt.nz (with 'CSRf application' in the subject line) or post it to:

Contaminated Sites Remediation Fund
Ministry for the Environment
PO Box 10362
Wellington 6143

SECTION 1: Applicant details

See page 17 of the guide for information about this section.

Organisation details

Regional council/unitary authority's legal name <i>one name only</i>	Canterbury Regional Council		
Trading name (if different)	Environment Canterbury		
Physical address <i>include post code</i>	200 Tuam Street Christchurch 8011		
Postal address <i>include post code</i>	P O Box 345 Christchurch 8140		
Telephone	(03) 365 3828 <i>landline</i>		(03) 365 3194 <i>fax</i>
Website address	www.ecan.govt.nz		

Contact person details

Principal contact name	Conor Parker		
Position	Contaminated Sites Officer (!)		
Email address	Conor.parker@ecan.govt.nz		
Telephone	(03) 365 3828 <i>work</i>	s 9(2)(a)	(03) 365 3194 <i>Fax</i>
Back-up contact name	Davina McNickel		
Position	Team Leader Contaminated Sites		
Email address	Davina.mcnickel@ecan.govt.nz		
Telephone	(03) 3653828 <i>work</i>	(027) 549 7718 <i>mobile</i>	(03) 365 3194 <i>Fax</i>

SECTION 2: Landowner/occupier details

Contact details

Complete the following table. This section does not need to be completed if the landowner/occupier cannot be identified, or is deceased, or has ceased trading.

If there is more than one landowner/occupier, record the information in a separate Word document, and submit this with your application.

See page 18 of the guide for information about this section.

Landowner's/occupier's legal name <i>one name only</i>	See attached document titled "s 9(2)(a) List of Landowners".		
Trading name (if different)	n/a		
Principal contact name	n/a		
Relationship to site	<input checked="" type="checkbox"/> Landowner <input type="checkbox"/> Occupier <input type="checkbox"/> Other <i>please specify</i>		
Physical address <i>include post code</i>	See "s 9(2)(a) List of Landowners"		
Postal address <i>if different from physical address</i> <i>include post code</i>	See "s 9(2)(a) List of Landowners"		
Email address	See "s 9(2)(a) List of Landowners"		
Telephone	(0_) <i>work</i>	(0_) <i>mobile</i>	(0_) <i>Fax</i>
Website address	n/a		

SECTION 3: Project details

1 What are the details of your project?

You will need to supply further details about requested funding in Section 7 of this application form.

See page 19 of the guide for information on how to complete this question.

Project name <i>maximum eight words</i>	s 9(2)(a) Landfill investigation
Project phase(s) included in this application <i>tick as many as applicable</i>	<input checked="" type="checkbox"/> Site investigation (phase two) <input type="checkbox"/> Remediation planning (phase three) <input type="checkbox"/> Site remediation (phase four)
Project purpose <i>maximum 40 words</i>	The purpose of this project is to characterise the extent and severity of soil contaminated with lead and other heavy metals in the area bounded by s 9(2)(a)
Over how many financial years are you seeking funding?	One (July 1, 2017 – June 30, 2018)
What is the total anticipated cost for the project phase(s) covered by this application?	s 9(2)(b)(ii)

2 What objectives have been set for your project, and how do you intend to achieve them?

Specify the 'SMART' objectives for your project and provide detail about the types of activity that will be undertaken to meet the objectives. How will you measure their effectiveness of the activities using key performance indicators (KPIs)?

Ensure that a cost benefit analysis is submitted with your application (if one has been undertaken).

See page 20 of the guide for information on how to complete this question (maximum 100 words per row).

Press the Tab key on your keyboard to add more rows to the table, if required.

Objective	Activity	KPI
Fully characterise the contaminants of concern by area, depth and concentration.	<ul style="list-style-type: none"> Develop concept and sampling plan in accordance with Ministry guidelines CLMG 1 and 5. Undertake detailed site investigation in accordance with sampling plan. 	Data quality objectives for the site investigation are met

3 What are the expected benefits of the project?

Complete the table below. Ensure that all benefits are 'SMART' (maximum 40 words per cell).

See pages 21 and 22 of the guide for further information and examples.

Press the **Tab** key on your keyboard to add more rows to the table, if required.

Type of benefit	Description
<i>Economic, social, environmental, cultural or other type of benefit</i>	<i>Provide a brief, clear description of the benefit</i>
Environmental/Human Health	The occupants of the houses, and any future occupants, will be aware of the status of the soil at their property.
Enhanced relationship with Christchurch City Council	Partnership will be strengthened with Environment Canterbury as the two bodies communicate and cooperate with each other on the project.
Environmental/Human Health	The investigation will help lead to the management or remediation of the landfill.

4 What is the scope of the project?

Provide information about what the project will do (in scope) and won't do (out of scope).

See page 22 of the guide for information on how to complete this question (maximum 300 words).

Press the **Tab** key on your keyboard to add more rows to the table, if required.

In scope	Out of scope
Undertake a detailed site investigation of the properties listed and adjacent public land.	Remediation of the site.

5 Are there any links to, or dependencies on, other projects?

Provide information about the links and dependencies that exist between this project and any other project or programme that may affect the delivery of this project (maximum 150 words per row).

See page 22 and 23 of the guide for information on how to complete this question.

Press the **Tab** key on your keyboard to add more rows to the table, if required.

Link or dependency	How this will be managed	Person responsible for monitoring
Willingness of residents to allow access to have their property investigated	Signed agreements allowing consultants to investigate their land. Regular, understandable communication with landowners.	Conor Parker
Availability of consultant who may be working on other projects	Terms and conditions agreed and contracts signed	Conor Parker

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6 How will you schedule your project?

Ensure that a high-level project schedule for the phase(s) covered in this project is submitted with your application. (A Gantt chart is recommended for large projects). The project schedule should provide the following information:

- start and end dates of the project
- delivery date for each milestone

See page 23 of the guide for information on how to complete this question.

Description	Start date	End date
Project start	01 July 2017	
Milestone 1: Tender and engage a consultant. Undertake detailed site investigation. Assess results and report outcomes to MfE.	01 July 2017	30 November 2017
Milestone 2:		
Milestone 3:		
Milestone 4:		
Milestone 5:		
Milestone 6:		
Project end		30 November 2017

7 How will you evaluate your project?

How will you know your project is successful?

Describe how the effectiveness of your project will be monitored, evaluated and reported, based on the KPIs and answers you provided in question two (maximum 300 words).

See page 24 of the guide for information on how to complete this question.

All milestones completed on time and on budget. Site contamination is suitably characterised, enabling the development of an assessment of remedial options. Landowners are provided with a summary report and site management plan (SMP) to mitigate any future risk of exposure to contaminated soil.

SECTION 4: Site information

8 What are the details of the site?

See page 25 of the guide for information on how to complete this question.

Site address	See attached document entitled "s 9(2)(a) List of Landowners".
Legal description(s) of site	See attached document entitled "s 9(2)(a) List of Landowners".
Description of site location and setting	The site is located in the Christchurch suburb of s 9(2)(a) to the south. All properties within the footprint of the site are residential properties with houses and gardens. The Heathcote River s 9(2)(a) located around s 9(2)(a) s 9(2)(a) of the site respectively. The surrounding land is also used for residential purposes.
Current use of site <i>include how water and land on the site are used</i>	Residential. Reticulated water supply and connection to Christchurch City Council wastewater and stormwater network.
When did the current landowner/occupier purchase the site?	All landowners purchased the land after the filling had taken place prior to 1940.

9 Is the site in an area that has cultural significance or natural, ecological, scientific or recreational value?

Yes No

If yes, provide details below (maximum 200 words).

See page 25 of the guide for examples.

--

10 What is the contamination history of the site?

Complete the table below.

Ensure that the phase one desktop study (undertaken by the council) is submitted with your application as supporting documentation.

See page 26 of the guide for examples.

Contamination history

<p>Which contaminants are present/ suspected to be present?</p> <p><i>Provide a general description</i></p>	<ul style="list-style-type: none"> • Heavy metals. Lead, arsenic, chromium, copper, zinc present well above expected background concentrations in surface soils and to depths up to at least 1.5 m below ground level. Lead contamination is the greatest concern, with concentrations at the site exceeding the residential soil contaminant standard by a factor of up to 28 times. • Asbestos
<p>When did contamination of the site occur?</p> <p><i>Provide accurate dates</i></p>	<p>The exact date that filling occurred at the site is unclear, but appears to have occurred around the early 1900's. The filling pre-dates houses that were built in the 1940's. The contamination was not discovered until after the 2010/2011 earthquakes when fill material was found during earthquake repair works for a number of houses in the area.</p>
<p>Potential risk to human health</p> <p><i>provide details</i></p>	<p>High (through direct contact). Initial XRF and laboratory samples collected at the properties showed contaminants exceeding the residential soil contaminant standards for residential land use with 10% produce consumption. A number of properties are unpaved and have vegetable gardens, with no barriers between residents and contaminated soil.</p>
<p>Potential risk to environment</p> <p><i>provide details</i></p>	<p>Low. Groundwater is not considered to be an at risk receptor, no migration of contaminants from the site are expected due to the expected small scale of the works involved in the detailed site investigation</p>
<p>What activities caused the contamination?</p>	<p>Land filling with suspected gas works or foundry waste.</p>
<p>Are these activities ongoing?</p> <p><i>If yes, are they subject to any controls (eg, discharge consent)?</i></p>	<p>No, the filling had likely ceased by the 1940's when the area was subdivided.</p>
<p>Has any action been undertaken to investigate or remediate the site?</p> <p><i>If yes, provide details</i></p>	<p>Yes. The site has been subject to a scoping study by Environment Canterbury, which included surface sampling using a portable XRF. The study was undertaken to determine the lateral extent of the contamination. Maps and results are attached to this application.</p> <p>A number of properties have had detailed site investigations undertaken on them for insurance purposes. However, these were limited in scope and were largely for characterising the soil for disposal options, rather than assessing risks to human health. These reports are attached to this application.</p>

11 What is the proposed use of the site following remediation?

Provide information about the proposed use of the site following remediation (maximum 200 words).

See page 26 of the guide for an example.

Remediation is not part of this application. The site use will continue to be residential.

12 Will all (or part) of the site be sold following remediation?

Yes No Unknown

If yes, provide details (maximum 200 words).

See page 26 of the guide for further information.

Sale of property is not anticipated to be linked to remediation if remediation occurs at a future date. It is expected that remediated property values would meet the values prior to the discovery of contamination,

SECTION 5: Site risk screening

Use the information from your risk screening report (undertaken during phase one) to complete this section. Include any other relevant information.

Submit the risk screening report as supporting documentation with this application.

13 Have Hazardous Activity and Industry List (HAIL) activities been undertaken on the site? Yes No

If yes, provide any known information about the activities, including the names of companies, details of processes undertaken, and records of spills/incidents.

See page 27 of the guide for information on how to complete this question.

Press the Tab key on your keyboard to add more rows to the table, if required.

HAIL activities	Dates	
	Start	End
G3 – Landfill Sites	Pre 1941	Pre 1941

14 What are the site's hazard and pathway components?

Complete the following table using the information available to you at the time of application.

See page 27 of the guide for further information.

Hazard	Components <i>provide the information used to derive the components</i>	Affected receptor
Names of chemicals of concern	Lead, arsenic, chromium, copper, zinc	<input type="checkbox"/> surface water <input type="checkbox"/> groundwater <input checked="" type="checkbox"/> direct contact exposure
Toxicity of chemicals of concern	1 – High	<input type="checkbox"/> surface water <input type="checkbox"/> groundwater <input checked="" type="checkbox"/> direct contact exposure
Volume of chemicals on the site, or the volume of land affected	1 – High, soil from all exposed parts of the site is contaminated with heavy metals	<input type="checkbox"/> surface water <input type="checkbox"/> groundwater <input checked="" type="checkbox"/> direct contact exposure
Mobility of chemicals of concern	0.3 – 0.7 – Low – medium. Due to the age of the material, highly leachable content has likely already been removed.	<input type="checkbox"/> surface water <input type="checkbox"/> groundwater <input checked="" type="checkbox"/> direct contact exposure
Pathway	Components <i>provide the information used to derive the components</i>	
Containment of chemicals/contamination	1 – No containment	
Thickness and nature of low permeability layer	0.7 – sandy silts overlying coastal confined aquifer	
Soil type (permeability)	1 – fill from 0.0 m to 0.5 - >1.8 m bgl. Silts below 0.5 – 1.8 m.	
Distance to user	1 – at surface	
Depth to hazard	1 – surface soils	
Type of aquifer present	1 – coastal confined aquifer	
Direct/sediment run-off and flood potential	0.6 – medium potential. Waterways located 23 m (Heathcote River) and 45 m (Jackson's Creek) from the site.	

SECTION 6: Partnerships

15 Has appropriate due diligence been completed on the current landowner/occupier? Yes No

If yes, please attach evidence to this application.

See page 28 of the guide for further information.

The landfill only came to the attention of Environment Canterbury following the submission of detailed site investigations for earthquake repair works in 2015. Prior to receiving the reports, the area was not identified in Environment Canterbury's records (Listed Land Use Register (LLUR)). The LLUR details would not have been on any LIMs provided to residents by the Christchurch City Council when residents purchased their properties.

16 Is the current landowner/occupier willing to contribute financially to the remediation? Yes No

If yes, provide further information below. If no, provide the reasons why (maximum 100 words).

See page 28 of the guide for further information.

N/A. Remediation is not part of this application and options have not been investigated at this stage.

17 Is the current landowner/occupier willing to support the remediation in other ways? Yes No

If yes, provide further information below. If no, provide the reasons why (maximum 100 words).

See page 28 of the guide for further information.

N/A. Remediation is not part of this application and options have not been investigated at this stage.

18 Which individuals/partner organisations will be involved in the project?

What do your partner organisations bring to the project? Complete the table below (maximum 40 words per row).

If your application is successful we may contact the person to discuss the project.

See page 28 of the guide for information on how to complete this question.

Press the Tab key on your keyboard to add more rows to the table, if required.

Name of individual/organisation	Details of involvement	Contact person	Position	Phone number and email
Environment Canterbury	Project manager	Conor Parker	Contaminated Sites Officer (II)	027 8390101 Conor.Parker@ecan.govt.nz

Environment Canterbury	Project Executive	Stefanie Rixecker	Director - Science	021 878 239 Stefanie.Rixecker@ecan.govt.nz
Environment Canterbury	Financial contribution	Stefanie Rixecker	Director - Science	021 878 239 Stefanie.Rixecker@ecan.govt.nz
Christchurch City Council	Financial contribution	Tracey Weston	Team Leader Compliance Support	03 941 8653 Tracey.Weston@ccc.govt.nz
CDHB	Public Health Advice	Matt Willoughby	Health Protection Officer	03 378 6733 Matt.Willoughby@cdhb.health.nz

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19 Who are the project's stakeholders?

Complete the table below (maximum 40 words per row).

See page 28 and 29 of the guide for information on how to complete this question.

Press the **Tab** key on your keyboard to add more rows to the table, if required.

Stakeholders <i>List the stakeholders that are included in this project</i>	Details <i>Give a brief description about their involvement and how your project will support and strengthen the partnerships between the stakeholders</i>
s 9(2)(a) [redacted] [redacted] landowners	The landowners were unaware of the contamination in the soil when they bought their properties. Partnership will strengthen with Environment Canterbury and Christchurch City Council as works are undertaken to assess the extent and severity of the contamination.
Environment Canterbury	Environment Canterbury have performed an initial scoping study of the area. Partnership will be strengthened with the Christchurch City Council and the wider community as Environment Canterbury demonstrates its ability to be proactive and supportive in contentious contaminated land situations. Environment Canterbury will contribute \$s 9(2) 0 towards this phase of the project. (a) s
Christchurch City Council	Partnership will be strengthened with Environment Canterbury as the two bodies communicate and cooperate with each other on the project. Christchurch City Council will contribute \$s 9(2) 0 towards this phase of the project if the application to MfE is successful. (a) s
Canterbury District Health Board	The Canterbury District Health Board have been involved in initial conversations and meetings with landowners, and have provided advice relating to the health implications on living on contaminated soil. Further advice will be sought following the completion of the detailed site investigation. Partnership will be strengthened as Environment Canterbury and the Canterbury District Health Board communicate and cooperate with each other on the project.

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SECTION 7: Milestones and funding

See pages 30 to 38 of the guide for important, step-by-step information on how to complete this section, including how the financial component of the funding is broken down, and how voluntary donations of time and expertise towards your project (in-kind contributions) are assessed.

20 What are the milestones for phase two of your project (site investigation)?

Only complete this question if phase two is included in this application.

Clearly outline **up to a maximum of six milestones** for phase two, including the tasks that make up each milestone (maximum 100 words per milestone).

Provide the total estimated cash cost for each milestone (exclusive of GST).

Do not include in-kind contributions as this is covered at question 22.

See pages 30 to 34 of the guide for information on how to complete this question.

Milestone	Description	Estimated timeframe	Total estimated cost (A) excluding GST
1	<ul style="list-style-type: none"> Tender and engage a consultant Undertake detailed site investigation Assess results and report outcomes to MfE 	5 months	s 9(2)(b) (1) 9(2)
2			\$
3			\$
4			\$
5			\$
6			\$
Estimated total cash cost for phase two (A)			s 9(2)(a), s 9(2)(b)

21 What are the milestones for phase three of your project (remediation planning)?

Only complete this question if phase three is included in this application.

Clearly outline up to a maximum of six milestones for phase three, including the tasks that make up each milestone (maximum 100 words per milestone).

Provide the total estimated cash cost for each milestone (exclusive of GST).

Do not include in-kind contributions as this is covered at question 22.

See page 35 of the guide for information on how to complete this question.

Milestone	Description	Estimated timeframe	Total estimated cost (A) <i>excluding GST</i>
1			\$
2			\$
3			\$
4			\$
5			\$
6			\$
Estimated total cash cost for phase three (A)			\$ 0

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22 What are the milestones for phase four of your project (site remediation)?

Only complete this question if phase four is included in this application.

Clearly outline up to a maximum of six milestones for phase four, including the tasks that make up each milestone (maximum 100 words per milestone).

Provide the total estimated cash cost for each milestone (exclusive of GST).

Do not include in-kind contributions as this is covered at question 22.

See page 35 of the guide for examples.

Milestone	Description	Estimated timeframe	Total estimated cost (A) <small>excluding GST</small>
1			\$
2			\$
3			\$
4			\$
5			\$
6			\$
Estimated total cash cost for phase four (A)			\$ 0

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23 Have you secured funding from other external sources (including partners)? Yes No

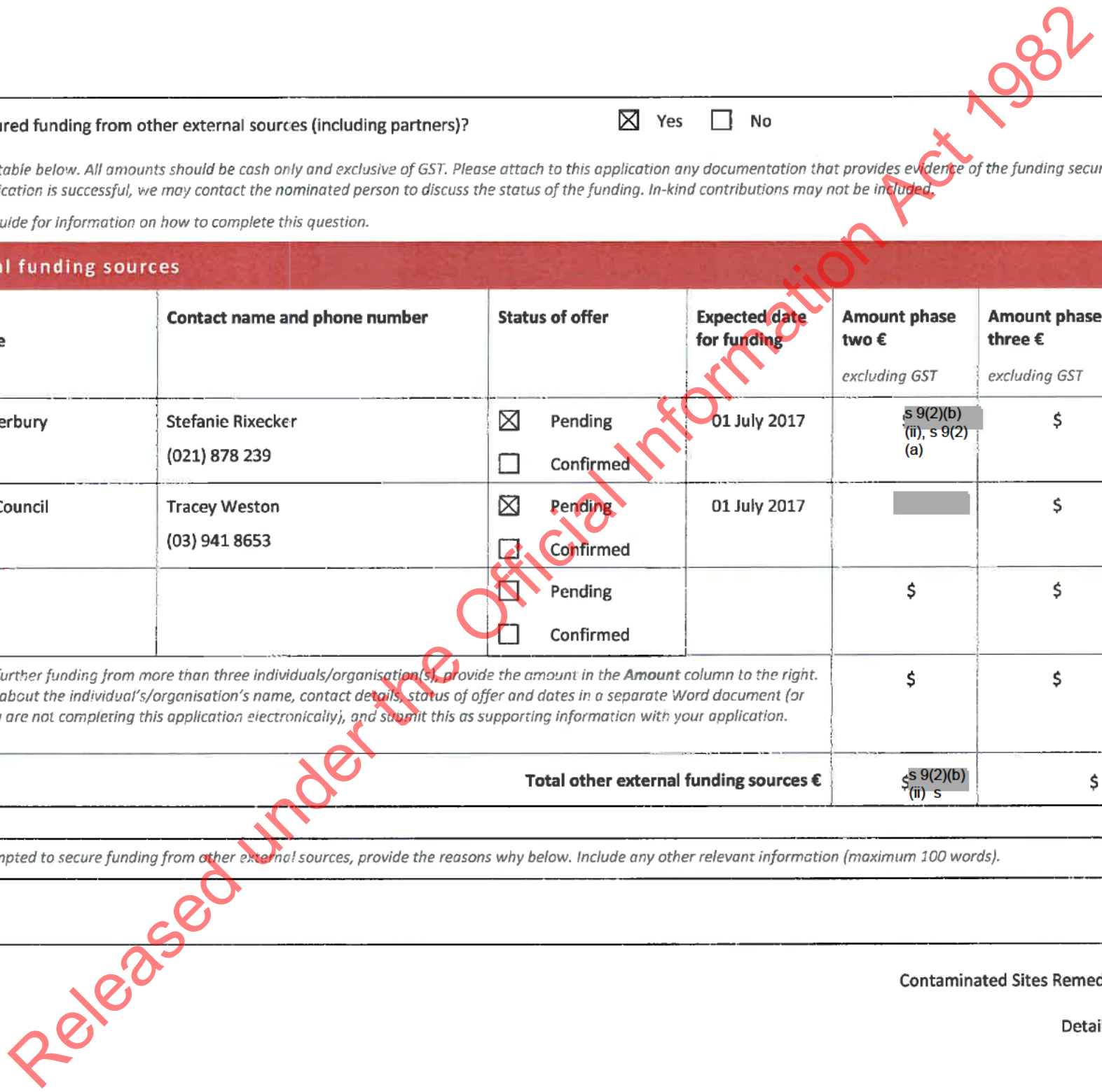
If yes, complete the table below. All amounts should be cash only and exclusive of GST. Please attach to this application any documentation that provides evidence of the funding secured from external sources. If your application is successful, we may contact the nominated person to discuss the status of the funding. In-kind contributions may not be included.

See page 36 of the guide for information on how to complete this question.

Other external funding sources

Individual/ organisation name	Contact name and phone number	Status of offer	Expected date for funding	Amount phase two € <i>excluding GST</i>	Amount phase three € <i>excluding GST</i>	Amount phase four € <i>excluding GST</i>
Environment Canterbury	Stefanie Rixecker (021) 878 239	<input checked="" type="checkbox"/> Pending <input type="checkbox"/> Confirmed	01 July 2017	§ 9(2)(b) (ii), s 9(2) (a)	\$	\$
Christchurch City Council	Tracey Weston (03) 941 8653	<input checked="" type="checkbox"/> Pending <input type="checkbox"/> Confirmed	01 July 2017		\$	\$
		<input type="checkbox"/> Pending <input type="checkbox"/> Confirmed		\$	\$	\$
If you have secured further funding from more than three individuals/organisation(s), provide the amount in the Amount column to the right. Provide information about the individual's/organisation's name, contact details, status of offer and dates in a separate Word document (or piece of paper, if you are not completing this application electronically), and submit this as supporting information with your application.				\$	\$	\$
Total other external funding sources €				§ 9(2)(b) (ii) s	\$ 0	\$ 0

If you have not attempted to secure funding from other external sources, provide the reasons why below. Include any other relevant information (maximum 100 words).



24 Provide detailed information about the estimated in-kind contributions your project will receive.

Provide information about the estimated in-kind contributions that your project will receive, including the estimated amounts (maximum 100 words per row).

Note that in-kind contributions are separate from the cash costs of the project.

See pages 36 and 37 of the guide for information on how to complete this question.

In-kind contributions summary

	Description	Phase two total estimated in-kind contribution (F) <i>excluding GST</i>	Phase three total estimated in-kind contribution (F) <i>excluding GST</i>	Phase four total estimated in-kind contribution (F) <i>excluding GST</i>
<p>Professional services and goods</p> <p><i>Calculate professional services using the actual hourly rate</i></p> <p><i>This includes council staff time</i></p>		\$	\$	\$
<p>Use/donation of equipment</p> <p><i>Calculate equipment and other charges using the actual hourly rate</i></p>		\$	\$	\$
<p>Facilities provided</p>		\$	\$	\$
<p>Community volunteers</p> <p><i>Calculate at a rate of \$30 per hour</i></p>		\$	\$	\$
<p>Other</p>		\$	\$	\$

Contaminated Sites Remediation Fund Phase/s:

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Total in-kind contributions (F)	\$ 0	\$ 0	\$ 0
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25 How much are you requesting from the CSRF, and how much have you obtained from other sources?

Complete rows B and D. Your answers from questions 18–22 will automatically populate rows A, C, E and F. All costs should be exclusive of GST.

See page 38 of the guide for information on how to complete this question, and about what the funding does not cover.

Funding summary

	Phase two	Phase three	Phase four
Estimated cash costs for project (A) <i>Cash costs (including contingencies) associated with the project only. Do not include in-kind contribution costs</i>	§ 9(2)(b)	\$ 0	\$ 0
Your cash contribution to the project (B) <i>The amount your council is contributing to the project</i>	§ 9(2)(b)(ii)	\$	\$
Other external cash funding sources, including partners € <i>Totals for any other funding you have secured</i>	§ 9(2)(b)	\$ 0	\$ 0
Funding sought from CSRF (D)	§ 9(2)(b)	\$	\$
CSRF share of costs € <i>Funding sought from CSRF (D) x 100 and divided by estimated project cost (A)</i>	70%	%	%
In-kind contributions (F) <i>Totals for any in-kind contributions you have secured</i>	\$ 0	\$ 0	\$ 0

The totals from the table above will automatically populate rows G and H. Ensure that you have ticked out of the table for the totals to calculate. All totals are exclusive of GST.

	Phase two	Phase three	Phase four
Estimated total costs for project (G) $G = A + F$	§ 9(2)(b)(ii)	\$ 0	\$ 0
Estimated overall costs for project (H) <i>This total is a sum of all project phases in the row above</i>	§ 9(2)(b)(ii)		

SECTION 8: Project management

26 What project governance is planned for the project?

Describe the project governance that is planned for the project, to ensure that decisions are made consistently and robustly, money is spent responsibly, and risk is managed effectively (maximum 250 words).

See page 39 of the guide for information on how to complete this question.

The project manager and project executive will oversee the tendering process. The consultant who submits the successful tender will be required to produce a project management plan detailing the costs, sampling and reporting timeframes for the project. The plan will be reviewed by the project manager and project executive, and any changes in scope, cost or schedule will be reflected in a subsequent project management plan.

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27 What are the proposed roles and responsibilities within the structure of your project?

Complete the table below with information about the roles and their responsibilities within the project structure. At a minimum, the first project manager and project executive rows of the table must be completed. Note that both these roles must be from the regional council or unitary authority. Complete the rest of the table as relevant to your project.

See pages 39, 40 and 41 of the guide for information on how to complete this question.

Press the **Tab** key on your keyboard to add more rows to the table, if required.

Role	Name of person	Phone no.	Email	Responsibilities	Time commitment
Project Manager	Conor Parker	(027) 839 0101	Conor.Parker@ecan.govt.nz	Project planning, contractor tendering, report preparation, liaison with MfE and landowners	10 days
Project Executive	Stefanie Rixecker	(021) 878 239	Stefanie.Rixecker@ecan.govt.nz	Assume responsibility for delivery of the benefits and success of the project.	2 days

Governance Group <i>(led by project executive, if applicable)</i> <i>provide list of names</i>		(0_)			
Project Board <i>(led by governance owner, if applicable)</i> <i>provide list of names</i>		(0_)			
Governance owner		(0_)			
Project team members <i>provide list of names</i>	Davina McNickel Stephen Gardner	(027) 549 7718 (027) 809 2036	Davina.McNickel@ecan.govt.nz Stephen.Gardner@ecan.govt.nz	Assist with project planning, contractor tendering, report preparation, liaison with MfE and landowners Assist with project planning, contractor tendering, report preparation, liaison with MfE and landowners	2 days 5 days

Contaminated Sites Remediation Fund Phase/s:

	Rowan Freeman	(027) 549 7719	Rowan.Freeman@ecan.govt.nz	Technical review/quality assurance of DSI report	2 days
Project administrator		(0_)			
Other roles <i>provide the role titles</i>		(0_)			

28 What is your risk management plan?

Complete the risk management table below by providing information about the top five risks that your project faces.
See page 41 of the guide for information on how to complete this question.

	Risk 1	Risk 2	Risk 3	Risk 4	Risk 5
Potential risk <i>Identify the potential risk to your project</i>	Health and Safety during sampling works	Change in project parameters/consultants	Landowner changes mind about allowing sampling to take place on their land		
Strategy to mitigate <i>Describe the process that you will use to minimise and manage the risk</i>	Job safety analysis sheet	Contracts from chosen consultant	Signed agreements allowing access. Full disclosure of project goals and potential outcomes		
Level of risk occurring <i>Select from the drop down box</i>	Low	Low	Low	Low	Low
Impact on project <i>Select from the drop down box</i>	Minor	Minor	Minor	Minor	Minor
Consequences	Injury or other harm to	Project delays while sourcing replacement	Project delays and incomplete		

Describe the consequences the risk would have on the project (eg, misunderstandings, duplication of work, incomplete work)	humans.	contractor	assessment/categorisation of site.		
--	---------	------------	------------------------------------	--	--

29 Does the organisation managing the project have a health and safety policy or plan? Yes No

If yes, provide copy of health and safety policy with application and go to question 30. If no, provide the reasons why (maximum 100 words) and then go to question 31.

See page 41 of the guide for further information.

Environment Canterbury standard Health and Safety policy can be supplied

30 Are the project's activities covered by the organisations existing health and safety policy or plan? Yes No

If yes, go to question 22. If no, go to question 31. See page 42 of the guide for further information.

31 Does a Health and Safety Plan need to be developed specifically for the project? Yes No

If yes, go to question 32. If no, provide the reasons why (maximum 100 words). See page 42 of the guide for further information.

A job safety hazard analysis plan will be developed prior to the commencement of works.

32 Who will be responsible for the health and safety plan and/or policy?

See page 42 of the guide for further information.

Contaminated Sites Remediation Fund Phase/s:

Name of person	Title	Organisation	Project role
Conor Parker	Contaminated Sites Officer (II)	Environment Canterbury	Project Manager

33 Will the health and safety plan and/or policy be audited and/or reviewed?

Yes No

If yes, provide details of who will undertake the audit/reviews and their frequency if known. If no, provide the reasons why (maximum 100 words). See page 42 of the guide for further information.

Name of person	Title	Organisation
Stefanie Rixecker	Director - Science	Environment Canterbury

34 Identify the five most significant hazards with the project

See page 42 of the guide for further information.

No.	Hazard	Potential impact	Management
1	Exposure to contaminated soil during investigation	Consultants and site users could be exposed to contaminated soils during the sampling which is known to be contaminated with heavy metals and asbestos.	Ensure consultant follows the provisions in the Health and Safety Plan and are wearing appropriate PPE during sampling works. Ensure landowners have a management plan and are aware of the status of their soil.
2	Personal injury from physical works	Consultants or site users could injure themselves during works.	Ensure consultant follows the provisions in the Health and Safety Plan and are wearing appropriate PPE during sampling works. Ensure site users are prevented from

			entering work areas.
3	Property or services damage from works.	Financial loss due to damage and associated repair works. Loss of faith in Environment Canterbury from site owners.	Ensure consultant follows the provisions in the Health and Safety Plan, and works are discussed with the landowner prior to investigations starting.
4			
5			

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35 What is your reporting plan?

Complete the reporting plan table below.

See page 43 of the guide for examples and information.

Press the **Tab** key on your keyboard to add more rows to the table, if required.

Target audience <i>Who is your target audience (eg, landowners, local community, central government)?</i>	Type of report <i>Provide the name of the report</i>	Purpose <i>What is the purpose of your reporting plan and what do you hope to achieve (eg, develop awareness, impart information, deliver education, bring about behaviour change, etc)?</i>	Timing <i>How often will the report be distributed?</i>
MfE, Governance group, Project Board	Project Status Report	Inform stakeholders of the progress made during the last month	Monthly – within 5 days of month end.
Landowners	Detailed Site Investigation Report	Inform landowners of the categorisation of the soil at their properties.	At the end of the project

36 What are your proposed quality assurance processes?

Complete the table below.

See page 43 of the guide for information on how to complete this question.

Press the **Tab** key on your keyboard to add more rows to the table, if required.

Deliverable <i>eg, final report</i>	Acceptance criteria <i>eg, report needs to comply with the Ministry's Contaminated Land Management Guidelines for reporting on contaminated land</i>	Person responsible <i>eg, project manager</i>	Due date
Detailed Site Investigation Report	Site is sampled in accordance with MfE CLMG 5. Report complies with MfE CLMG 1. Technical review by Environment Canterbury Principal Contaminated Sites Officer.	Project Manager	31 November 2017

SECTION 9: Additional information

37 Is there anything else we need to consider about your application?

This space is for you to provide any additional information that your organisation considers important, but has not been covered in previous sections of this application form, eg, any known conflicts of interest

Include any assumptions which have influenced the approach to the project (maximum 250 words).

See page 44 of the guide for information.

38 Are there any documents that the Ministry needs to read in conjunction with your application?

Yes No

If yes, complete the table below.

See page 45 of the guide for examples.

Ensure that the documents are submitted with this application form.

*Press the **Tab** key on your keyboard to add more rows to the table, if required.*

Name of document

s 9(2)(a)	List of Landowners
Environment Canterbury Scoping Study s 9(2)(a)	Results Tables and Maps
Environment Canterbury Scoping Study	XRF labelled data
Previous Detailed Site Investigations	
Christchurch City Council Funding Confirmation memo	
Environment Canterbury Funding Confirmation memo	

SECTION 10: Declaration


This declaration must be completed by a person with the council's signing authority.

See page 45 of the guide for further information.

Important: *Please contact the CSRF Team if you have any queries regarding the terms and conditions of the Funding Deed for the CSRF.*

As a duly authorised representative of the organisation as per Section 1 of this Contaminated Sites Remediation Fund application form:

- I declare that I have read, and agree to, the standard terms and conditions of the Funding Deed for the Contaminated Sites Remediation Fund.
- I declare that I have read the *Contaminated Sites Remediation Fund Guide for applicants for project funding*.
- I declare that to the best of my knowledge, the information contained in all sections of this application form, or supplied by us in support of our application is complete, true and correct.
- I declare that I have the authority to sign this application form and to provide this information.
- I declare that all regulatory requirements regarding the project have been met, and that any required approvals and/or consents have been granted.
- I understand that information presented to the Minister for the Environment and Ministry for the Environment is subject to disclosure under the Official Information Act 1982.
- I agree that the Ministry for the Environment may collect information about our organisation from other parties, and may liaise with local and national organisations in respect of this application.
- I agree that the Ministry for the Environment can undertake a background check on the applicant(s).

Name	Stefanie Rixecker	
Position	Director - Science	
Signature	Stefanie Rixecker 	Date: 31 March 2017
<p><i>By typing your name in the space provided you are electronically signing this application form.</i></p>		

Checklist

Use the following checklist to confirm you have provided all the required information in your application.

Do not include any attachments that the Ministry has not specifically requested.

- All sections of this application form completed
- Declaration signed and dated

The following supporting documentation attached:

- cost benefit analysis (if undertaken)
- high-level project schedule for the phase(s) covered in this project
- phase one desktop study
- risk screening report
- documents that the Ministry needs to read in conjunction with your application

Your feedback

Did you find this application form easy to understand and complete?

- Not at all Mostly Very

Provide general comments below.

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0 0.015 0.03 0.045 0.06
Kilometres

Scale: 1:1,000 @A4

Map Created by Environment Canterbury on 28/03/2017 2:43:40 p.m.

s 9(2)(a)

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s 9(2)(a)

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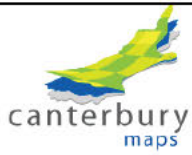


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Kilometres

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s 9(2)(a)



19-D-02771

s 9(2)(a)

- 1946

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0 0.015 0.03 0.045 0.06 Kilometres

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s 9(2)(a)



19-D-02771

s 9(2)(a)

- 1955

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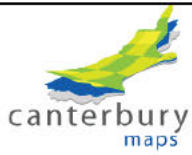


0 0.015 0.03 0.045 0.06 Kilometres

Scale: 1:1,000 @A4

Map Created by canterburymaps govt.nz on 1:44:06 p.m.

s 9(2)(a)



19-D-02771

s 9(2)(a)

- 1965

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0 0.015 0.03 0.045 0.06 Kilometres

Scale: 1:1,000 @A4

Map Created by canterburymaps govt.nz on 1:45:27 p.m.

s 9(2)(a)

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0 0.015 0.03 0.045 0.06
Kilometres

Scale: 1:1,000 @A4

Map Created by Environment Canterbury on 13/03/2017 11:19:28 a.m.

s 9(2)(a)

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickel	Zinc
S1	0.15	ND	110	64	5	23	118
S2	0.50	15	48	32	5	21	96
S3	0.15	13	17	56	11	22	69
S4	0.15	7	33	27	45	2	75
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	

*Soil Contaminant Standard

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Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickel	Zinc
S1	0.15	7	281	74	40	21	264
S2	0.15	ND	291	44	32	10	220
S3	0.50	5	46	45	11	20	60
S4	0.15	17	1345	76	102	49	708
S5	0.15	49	1345	67	130	29	512
S6	0.50	50	2021	99	494	72	1665
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

ND: Not detectable

Table 2: Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickel	Zinc	BaP eq.
S2	0.15	9	480	0.41	19	47	15	270	2.77
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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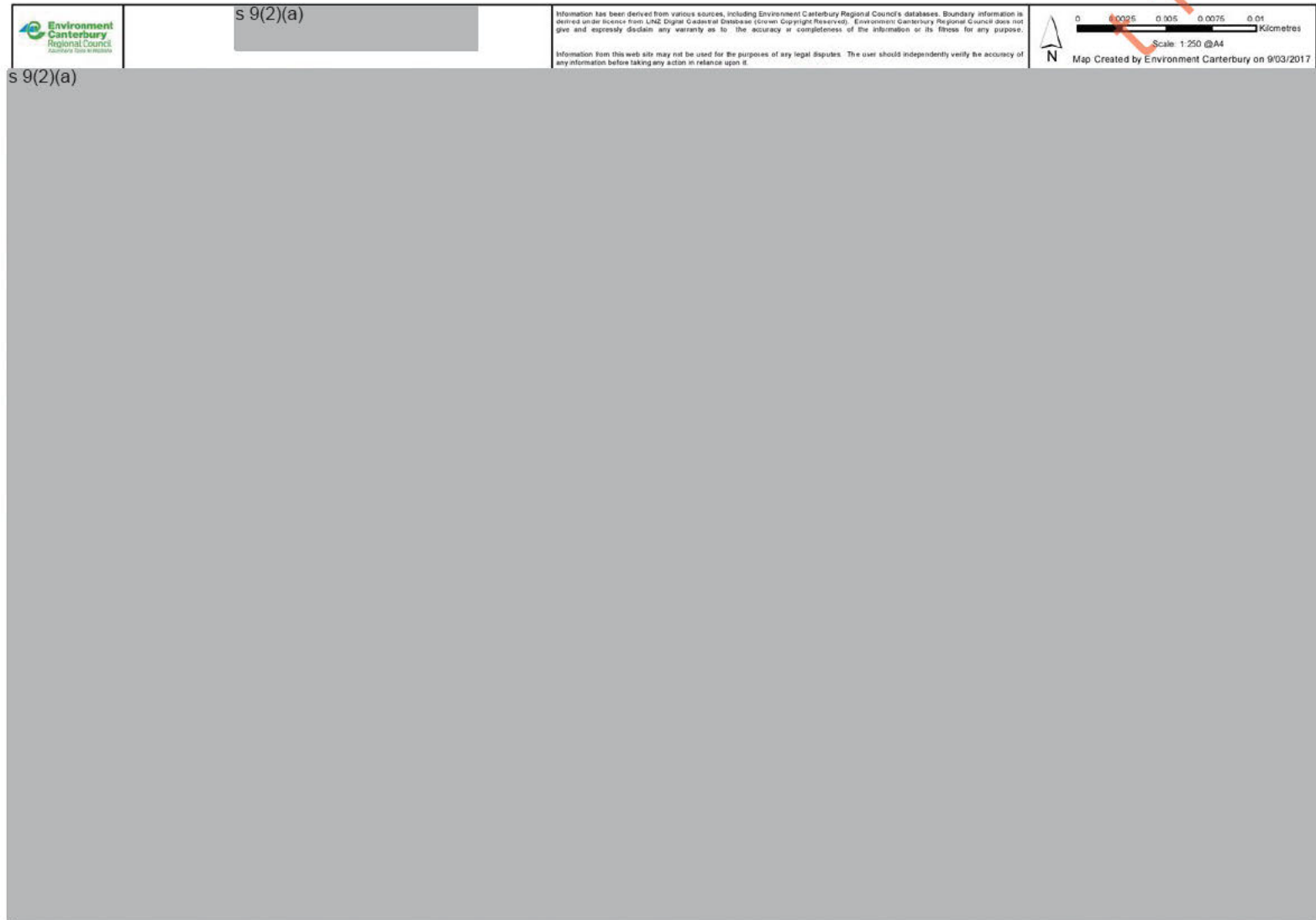


Figure 1. Soil sampling locations at s 9(2)(a)

Released

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickel	Zinc
S1	0.15	17	90	29	9	29	121
S2	0.50	3	2398	50	174	197	1800
S3	0.15	14	79	27	35	48	137
S4	0.50	4	144	17	47	49	138
S5	0.70	ND	322	47	18	24	275
S6	0.15	20	116	34	21	31	159
S7	0.50	9	23	43	23	33	57
S8	0.15	10	94	37	10	ND	119
S9	0.50	12	11	27	9	ND	46
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

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Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickel	Zinc
S1	0.15	8	457	57	18	39	255
S2	0.50	9	498	62	20	26	291
S3	0.15	10	70	31	6	23	121
S4	0.50	11	50	60	25	36	100
S5	0.15	27	78	42	19	36	135
S6	0.50	6	30	46	28	7	58
S7	0.20	13	174	22	15	ND	134
S8	0.50	18	163	39	8	39	203
S9	0.15	29	136	21	21	27	182
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹**Table 2:** Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickel	Zinc	BaP eq.
S5	0.15	18	95	0.41	18	22	12	136	0.24
S7	0.20	6	200	0.37	15	24	12	179	0.48
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickel	Zinc
S1	0.15	25	583	62	69	54	427
S2	0.15	48	546	44	118	43	364
S3	0.15	36	674	69	111	6	501
S4	0.15	86	1141	62	74	17	858
S5	0.15	96	4707	161	352	94	3235
S6 (raised bed)	0.15	8	42	34	18	ND	115
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

ND: Non detectable

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Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	20	465	57	101	43	467
S2	0.50	13	124	39	34	14	177
S3	0.15	4	107	60	47	45	149
S4	0.15	13	198	37	27	27	194
S5	0.50	10	10	34	25	38	56
S6	0.15	20	34	35	10	20	235
S7	0.15	14	37	54	11	44	64
S8	0.40	7	127	39	41	31	174
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

Soil Contaminant Standard¹**Table 2:** Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickel	Zinc	BaP eq.
S4	0.15	7	200	0.37	19	32	12	220	0.39
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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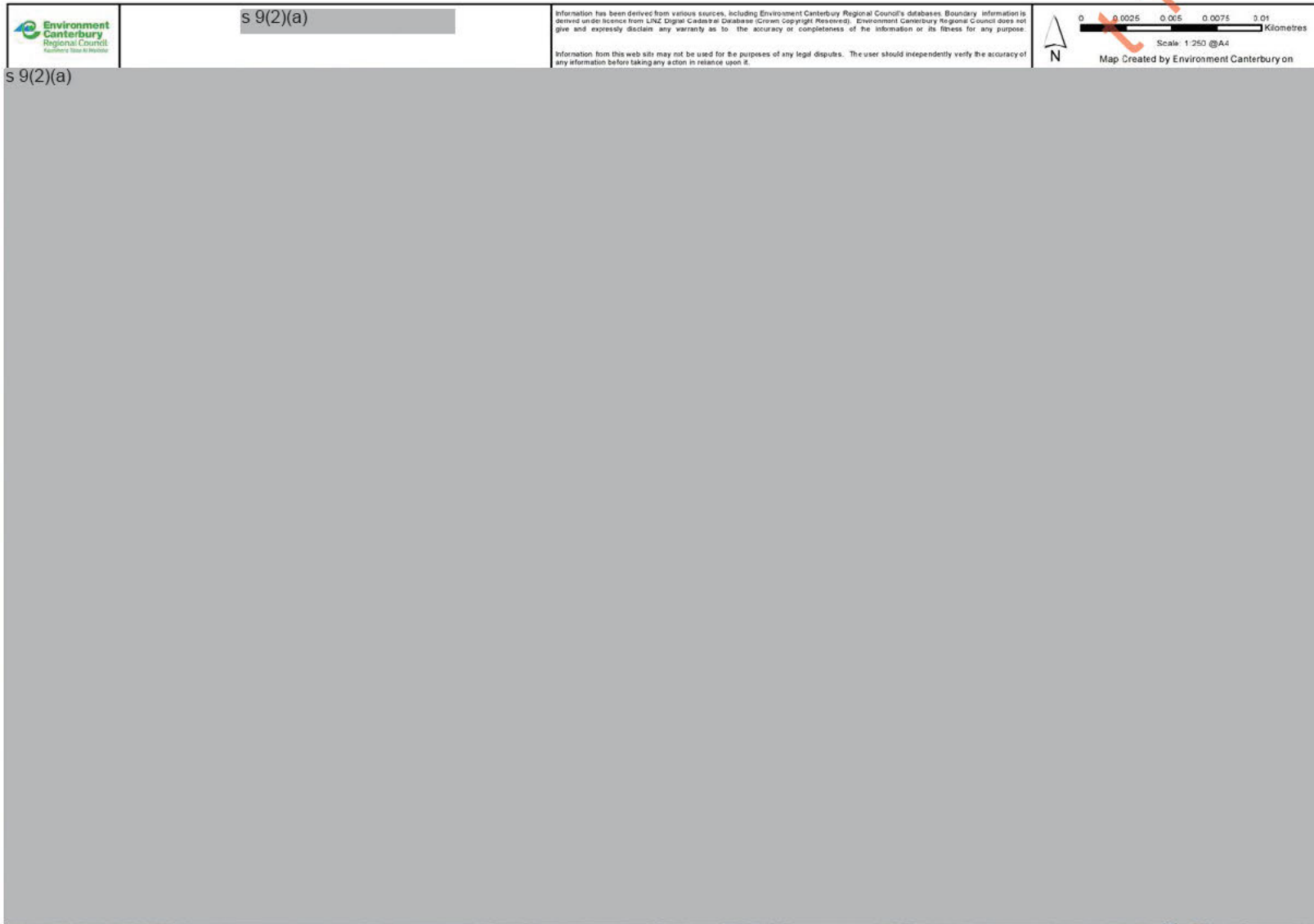


Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickel	Zinc
S1	0.15	10	891	27	128	31	532
S2	0.50	194	6455	576	1140	190	34212
S3	0.15	15	259	74	63	20	278
S4	0.50	ND	312	52	43	35	248
S5	0.15	1	170	61	34	ND	192
S6	0.50	19	113	27	19	20	116
S7	0.20	2	166	71	23	13	133
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

ND: Non detectable

Table 2: Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickel	Zinc	BaP eq.
S5	0.15	8	179	0.37	15	27	12	196	0.87
S7	0.20	11	161	0.24	13	26	11	123	0.48
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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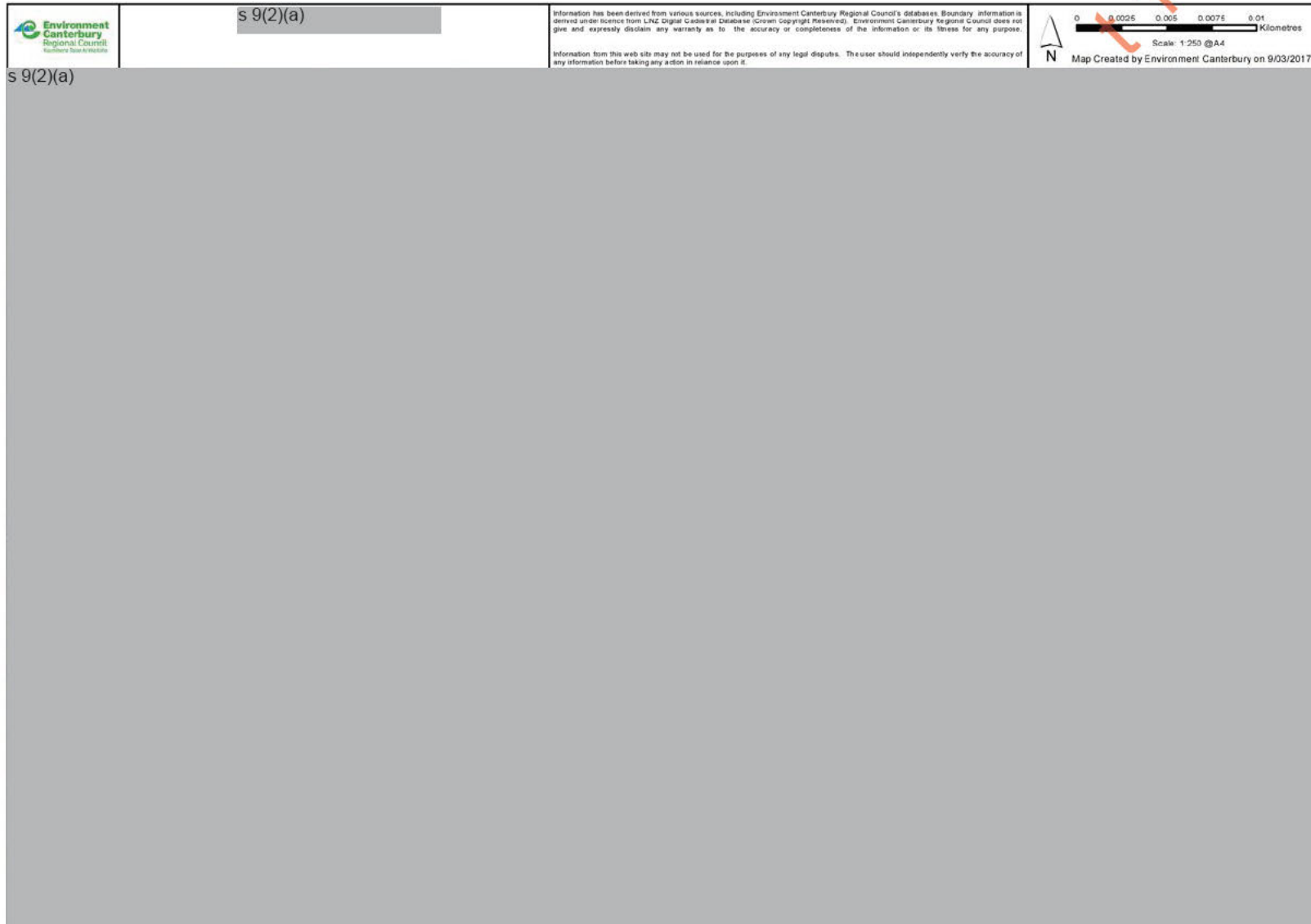


Figure 1. Soil sampling locations at s 9(2)(a)

Rele

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S6	0.15	2	40	33	0	53	71
S7	0.50	1	7	41	19	17	47
S8	1.00	3	15	34	0	46	32
S9	0.15	5	173	27	18	17	104
S10	0.50	3	15	24	1	4	41
S11 (Raised bed)	0.15	1	50	21	21	11	69
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

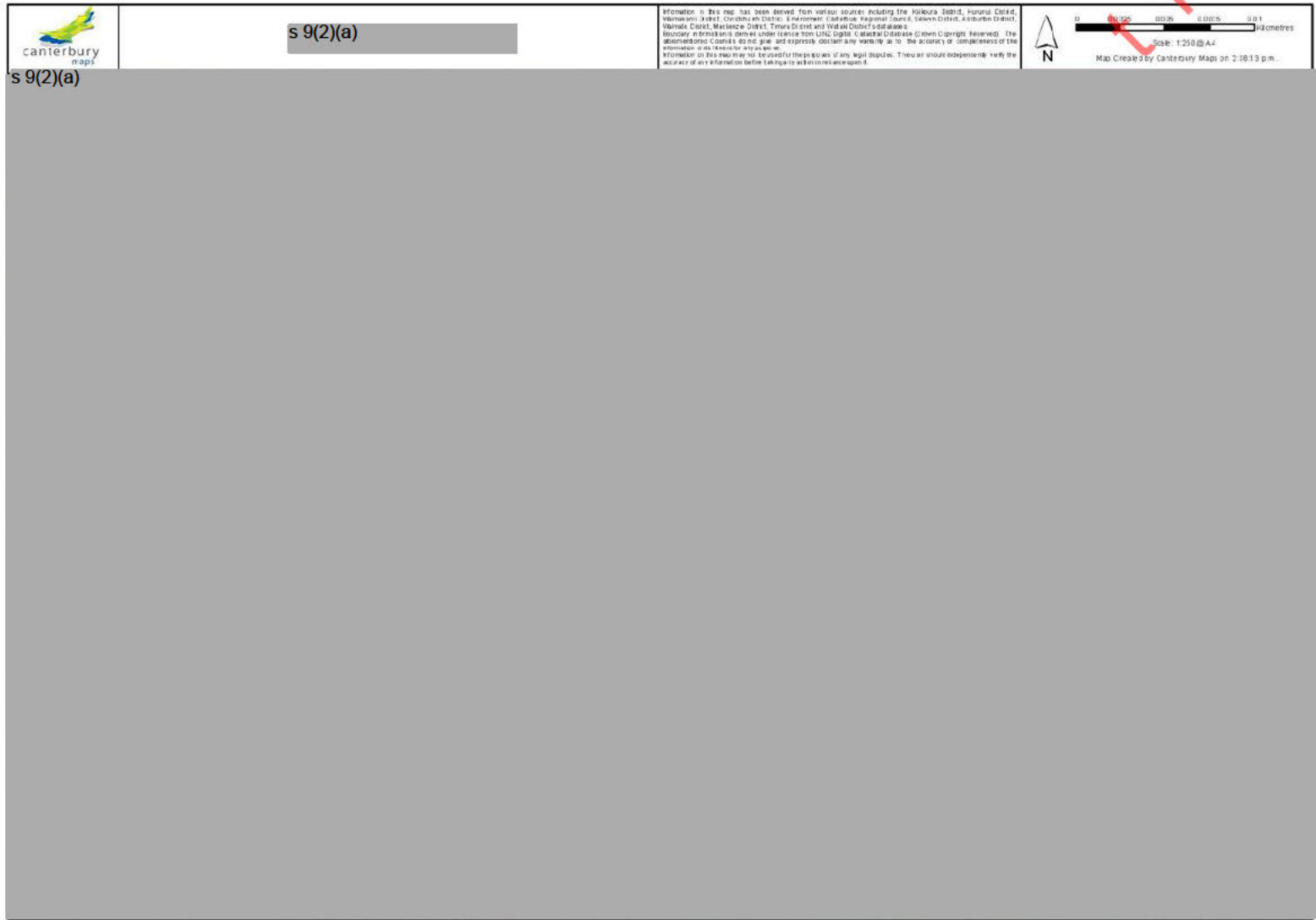
Table 2: Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickle	Zinc	BaP eq.
S9	0.15	4	125	0.2	13	15	12	110	1
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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s 9(2)(a)

Figure 1. Soil Sampling Locations at s 9(2)(a)

Released

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	6	231	50	16	8	284
S2	0.35	13	253	49	21	19	273
S3	0.15	7	275	49	8	9	185
S4	0.50	2	15	23	3	35	62
S5 (raised bed)	0.15	15	114	38	46	ND	250
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

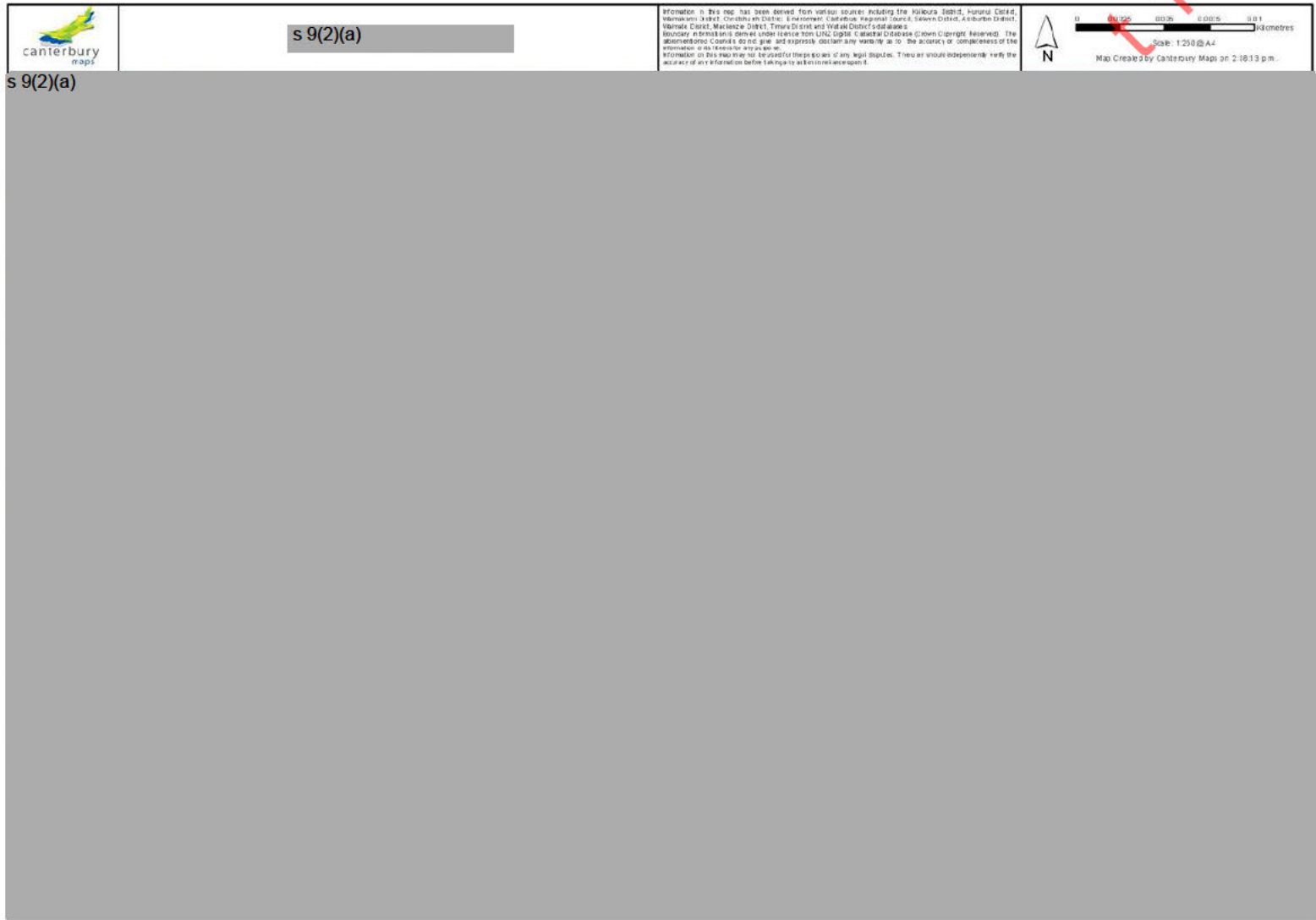
Table 2: Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickle	Zinc	BaP (eq.)
S1	0.15	5	240	0.41	16	21	12	300	0.34
S2	0.35	4	220	0.34	18	18	13	260	0.38
S3	0.15	3	240	0.34	18	7	12	192	0.49
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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Released

Figure 1. Soil Sampling Locations at ^{ss}9(2)(a)
9

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	ND	75	29	68	12	190
S2	0.50	6	31	35	13	12	85
S3	1.00	9	7	39	8	13	36
S4	0.15	4	24	20	20	12	71
S5	0.50	5	14	37	29	13	47
S6	1.00	ND	15	24	12	13	42
S7	0.15	8	37	33	23	12	96
S8	0.50	14	18	41	ND	25	78
S9	1.00	7	24	47	12	19	53
S10	0.15	13	451	47	67	28	425
S11	0.50	31	788	107	82	56	1961
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

ND: Non-detectable

Table 2: Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickle	Zinc	BaP eq.
S7	0.15	20	49	0.20	16	22	11	143	0.36
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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Figure 1. Soil sampling locations at s 9(2)(a)

Rele

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	13	778	78	87	33	609
S2	0.15	18	515	54	55	32	398
S3	0.15	3	281	30	15	15	227
S4	0.15	10	677	46	33	35	345
S5 (garden)	0.15	17	488	59	39	24	414
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹**Table 2: Laboratory results for s 9(2)(a) (mg/kg)**

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickle	Zinc	BaP eq.
S3	0.15	7	550	0.37	17	28	19	250	11.61
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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s 9(2)(a)

Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Metres (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	65	1339	181	119	24	694
S2	0.15	78	1975	140	210	66	1362
S3	0.15	49	1547	99	221	33	1153
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹
Table 2: Laboratory results for HR35-S2-0.15 (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickle	Zinc	BaP eq.
S2	0.15	26	3700	2.6	38	340	60	1670	87
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	ND	69	26	11	6	81
S2	0.50	11	18	19	6	32	48
S3	0.15	9	244	32	28	33	163
S4	0.50	9	506	44	71	37	466
S5	0.15	68	2415	150	215	28	1504
S6	0.50	69	3419	203	339	49	2703
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000		-

*Soil Contaminant Standard¹

ND: Non-detectable

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Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	37	1268	62	157	46	27
S2	0.15	48	1160	79	165	31	1054
S3	0.15	2	73	29	23	23	109
S4	0.50	7	16	28	4	39	41
S5	1.00	6	8	32	6	38	39
S6	0.15	3	20	15	5	23	58
S7	0.50	8	ND	30	8	28	33
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

Soil Contaminant Standard¹

ND: Non-detectable

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Figure 1. Soil sampling locations at s 9(2)(a)

Released

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	7	91	38	30	31	110
S2	0.30	0	58	39	26	7	77
S3	0.15	5	26	33	8	25	58
S4	0.50	6	12	37	7	34	27
S5	1.00	4	10	28	4	26	36
S6	0.15	10	138	39	53	9	175
S7	0.50	ND	16	38	ND	28	46
S8	1.00	9	19	52	29	30	59
S9	0.15	7	87	43	0	22	64
S10	0.50	6	19	37	17	25	56
S11	1.00	2	18	36	13	25	28
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

ND: Non-detectable

Table 2: Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickle	Zinc	BaP eq.
S6		7	130	0.14	16	69	20	145	5.7
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	11	89	24	8.5	34	130
S2	0.50	2	36	33	26	46	85
S3	0.15	11	152	36	15	27	248
S4	0.50	3	29	37	4	7	205
S5	0.15	6	201	34	18	16	202
S6	0.50	5	143	33	21	26	193
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

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s 9(2)(a)

Figure 1. Soil sampling locations at s 9(2)(a)

Rele

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	10	27	37	18	ND	35
S2	0.50	1	10	34	4	23	29
S3	0.15	9	22	21	11	23	34
S4	0.50	6	9	40	11	4	25
S5	0.15	ND	542	97	13	19	305
S6	0.50	ND	91	30	19	14	97
S7	0.15	12	233	57	15	14	214
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

Soil Contaminant Standard¹

Nd: Non-detectable

Table 2: Laboratory results for s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Cadmium	Chromium	Copper	Nickle	Zinc	BaP eq.
S7	0.15	6	230	0.42	16	17	12	176	0.35
Background		16.3	129	0.2	20	19.5	18	167	-
Residential SCS*		20	210	3	290	>10,000	-	-	10

*Soil Contaminant Standard¹

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Figure 1. Soil sampling locations at s 9(2)(a)

Relea

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	13	488	10	154	49	665
S2	0.50	3	2	37	ND	ND	36
S3	1.00	5	46	42	ND	22	84
S4	0.15	29	950	86	208	52	1084
S5	0.50	45	561	38	481	82	1031
S6	0.15	121	3803	306	312	98	3084
S7	0.50	264	3370	336	2237	74	3560
S8	0.15	11	457	45	97	16	319
S9	0.50	3	74	25	ND	22	99
S10	1.00	ND	92	16	ND	8	55
S11 (garden)	0.15	26	535	66	117	19	589
S12	0.15	49	854	69	194	37	84
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

ND: Non-detectable

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Figure 1. Soil sampling locations at s 9(2)(a)

Rele

Table 1: XRF results from s 9(2)(a) (mg/kg)

Sample	Depth (m)	Arsenic	Lead	Chromium	Copper	Nickle	Zinc
S1	0.15	74	3065	120	303	88	2035
S2	0.50	84	2944	167	498	124	2404
S3	0.15	136	3560	148	454	76	2770
S4	0.15	78	2861	102	245	65	1785
S5	0.15	88	3436	131	283	69	2442
Background		16.3	129	20	19.5	18	167
Residential SCS*		20	210	290	>10,000	-	-

*Soil Contaminant Standard¹

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Figure 1. Soil sampling locations at s 9(2)(a)

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GHD Ltd

Project HSE Plan

s 9(2)(a)

Landfill DSI

December 2017

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Appendix

Appendix A – JSEA

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1. Introduction

1.1 General

This HSE plan relates to proposed intrusive works at the former s 9(2)(a) landfill at s 9(2)(a) Christchurch. The project area contains a number of residential properties which lie on the site of a former landfill.

The provisions of this Health, Safety and Environment Plan (Project HSE Plan) are mandatory for every person in GHD. The implementation of this Project HSE Plan facilitates delivery GHD's core HSE principles:

- We are all empowered to stop unsafe acts
- We take responsibility for our own and each other's safety
- We plan our work to prevent unsafe situations
- We improve by learning from our experiences
- Our suppliers and contractors support our vision and principles

GHD is totally committed to upholding and enforcing these principles that form the backbone of our HSE Management System. The project manager retains the right to suspend/stop work for any infraction of this Project HSE Plan. This may result in disciplinary action being taken against individual staff and GHD engaged external suppliers.

This Project HSE Plan is to be read and implemented in consultation with and other GHD-specific HSE Management System documentation including Hazard Guides as identified in the Job Safety Environmental Analysis (JSEA) provided in Appendix A.

The scope of this plan includes the identification and control of security related matters.

1.2 Purpose

The functional HSE Management System documents that directly relate to GHD projects are detailed below.

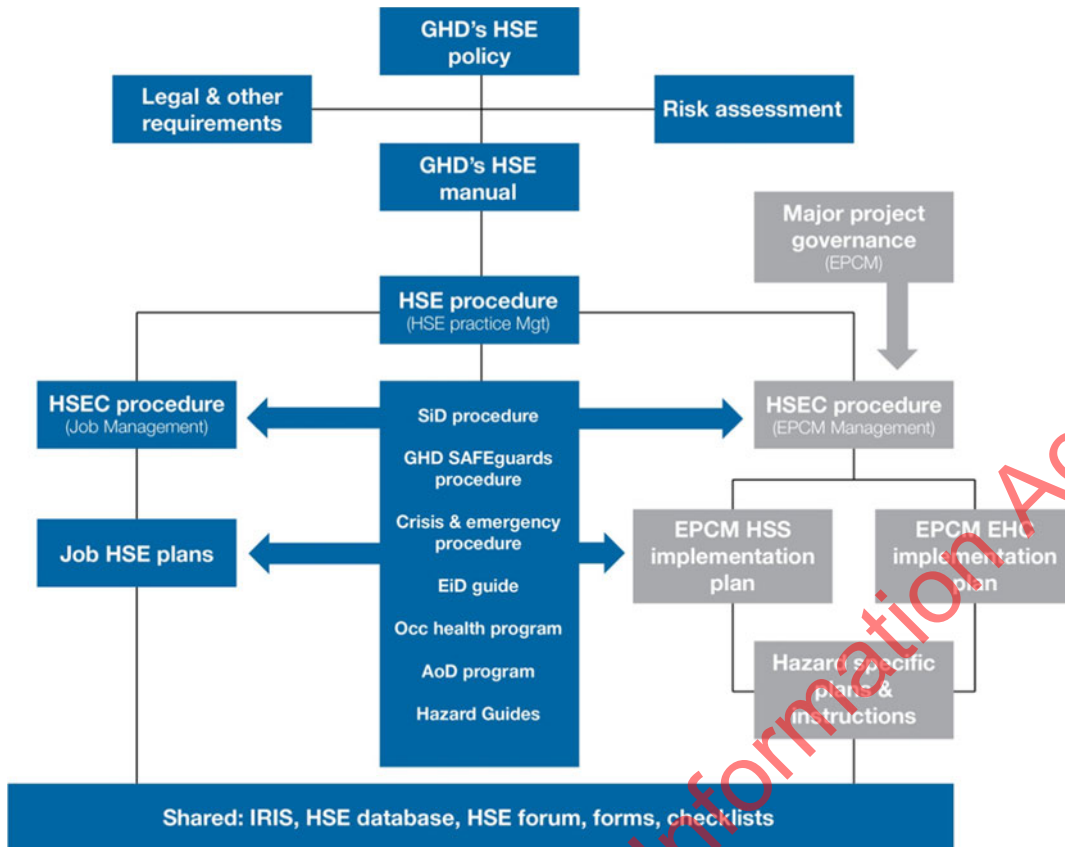


Figure 1-1 GHD's Management System

This Project HSE Plan aims to identify the processes to be implemented for the management of health, safety, environmental (HSE) within the agreed project scope. The Project HSE Plan has been developed to:

- Meet the requirements of GHD's Health Safety and Environment Policy
- Align with and deliver on the performance requirements of the HSE Management System
- Describe the processes in place to effectively manage the HSE operational elements of the project
- Meet any other HSE requirements included in the project (e.g. legal, client etc)

This Project HSE Plan will be updated as necessary to address any additional activities or changes to GHD's business - changes or alterations will be registered in the document history within the management system portal.

1.3 Referenced documents

A range of documents have been referenced in the development of this Project HSE Plan and are tabulated below.

Table 1-1 Document Titles

Released under the Official Information Act 1982

Title
GHD HSE Policy
AUS-PRO-HSE-01 Business Management
11.01.02 HSE Project Management
AUS-SOP-HSE-060 Safety in Design
GHD-SOP-HSE-019 Environmental Stewardship
GHD-SOP-HSE-010 Crisis and Emergency Management
GHD-SOP-HSE-059 SAFEguards
AUS-SOP-HSE-001 Alcohol and Other Drugs
AUS-SOP-HSE-050 Occupational Health Monitoring
GHD-SOP-HSE-004 SMART Behaviours
AUS-FM-HSE-065 Project HSE Review (P2,P3,P4)
AUS-FM-HSE-027 Management JSEA Site Review
AUS-FM-HSE-018 Checklist Site Inspections
AUS-FM-HSE-028 Project HSE Audit Tool
AUS-FM-HSE-015 HSE Inspection and Monitoring Schedul
AUS-FM-HSE-053 Induction/Briefing Register
AUS-FM-HSE-008 Project HSE Plan deliverables checklists (P2, P3, P4)
AUS-SOP-HSE-067 Smoke Free Workplace
QA020A Project Briefing Sheet
AUS-FM-HSE-010 Risk Assessmen
AUS-SOP-HSE-024 Environment in Design
AUS-FM-HSE-040 Safety in Design Risk Assessment
AUS-FM-HSE-041 Safety in Design Review
AUS-SOP-HSE-029 First Aid
AUS-FM-HSE-056 First Aid Register
AUS-SOP-HSE-025 Flora and Fauna
AUS-SOP-HSE-061 Signs and Notices
AUS-SOP-HSE-075 Waste Management and Contamination
AUS-SOP-HSE-049 Noise
AUS-SOP-HSE-047 Manual Handling
AUS-SOP-HSE-021 Electrical Safety – Low Voltage
AUS-SOP-HSE-022 Electrical Safety – High Voltage
AUS-SOP-HSE-026 Fatigue Management
AUS-SOP-HSE-068 Soil Erosion, Sedimentation and Dust Control
AUS-SOP-HSE-020 Excavation
AUS-SOP-HSE-002 Asbestos Management
AUS-SOP-HSE-020 Excavations
AUS-SOP-HSE-054 Personnel protective Equipment (PPE
AUS-SOP-HSE-052 Overhead and Underground Utilities
AUS-SOP-HSE-031 Heights
AUS-SOP-HSE-048 Mobile Plant
AUS-SOP-HSE-077 Weather – Extreme and Natural Events
AUS-FM HSE-057 Serious Incident Investigation

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Title
AUS-FM-HSE-014 HSE Corrective Actions Register
GHD-SOP-HSE-069 Stop Work Authority
AUS-SOP-HSE-057 Remote and Isolated Working
AUS-SOP-HSE-071 Traffic Management
AUS-FM-HSE009 Project Safety and Environment Analyses (JSEA) –Including Pre-Work Assessment
Hazard Guides – see Section 6
GHD Crisis and Emergency Management Plan
OC Emergency Response Plan
1.02.01 Preparation and Control of Management System Documents (Quality)

1.4 Site Location and Layout

The site is located in the suburb of s 9(2)(a) Christchurch (Figure 1-2). It comprises a block of residential properties bordered by s 9(2)(a). The Heathcote River runs immediately to the west of the site in a north east to south west direction. The area rises to two higher platforms, one to the north west and one to the south west of the block (Figure 1-3). The section between them is noticeably lower in elevation than the surrounding land. s 9(2)(a) and discharges into the Heathcote River.

Structures in the area are residential buildings on landscaped sections, comprising of gardens and lawns. Parts of the site are sealed with concrete and asphalt used for driveways.

Contaminants of concern on the site include:

- Arsenic
- Lead
- Chromium
- Copper
- Zinc
- Polycyclic aromatic hydrocarbons (PAHs)
- Potentially Asbestos

Key risks which will need to be managed include:

- Damage to services – workers will need to ensure there is no damage to any of the services in the area, and measures will need to be taken to ensure overhead services will not pose a risk to workers.
- Damage to resident's property – Care will need to be taken to ensure there is no damage to the structures on site, and that the sampling is done in a way which minimises damage to lawns and gardens
- Moving plant – care will be needed when operating with and around the mini-drill rig and window sampler
- Soil and groundwater – the soil and groundwater is potentially contaminated with metals, PAHs, and potentially asbestos. Care will be required to ensure that the worker on site does not expose

themselves to the soil without adequate protection, and that the soil does not contaminate the surface of the site.

- Soil vapour – staff on site will need to be protected from exposure to soil vapours
- Traffic – traffic from the surrounding roads, along s 9(2)(a) and from driveways will pose a hazard to workers on site.
- Driving – care will be required going to and from site.
- Exposure – works will be undertaken in summer, temperatures may exceed 25°C for much of the time work will be undertaken on site. Risks include heatstroke and sunburn.
- Noise – noise generated by works will need to be managed

s 9(2)(a)



Figure 1-2 Location of Site

s 9(2)(a)



2

Figure 1-3: View from Elevated South West portion of the site, looking north

1.5 Scope of work

The following scope of work is proposed to be conducted at the site:

- Stage 1: Service clearance and gaining site access
- Stage 2: Intrusive works – Drilling, window sampling and hand auguring with soil sample collection

1.5.1 Stage 1: Service clearance and gaining site access

Site access will be negotiated with the landowners before work is undertaken on site. GHD will undertake a pre-assessment using B4UDig and private plans from Christchurch City Council and use Underground Service Locators (USL) to locate any underground services in the area to be sampled. Services will not be marked but assessed as to where they run compared to our proposed sample locations. A peg or small amount of spray-paint will be used to indicate the sampling location.

1.5.2 Stage 2: Intrusive works

The following intrusive works will be undertaken:

- 13 bores using a small drilling rig to a maximum of 5 m below ground level (bgl)
- 15 bores using a window sampler to a maximum of 5 m bgl.
- 13 shallow bores using a hand auger to a maximum of 1 – 2 m bgl.

A sampling plan has been developed to delineate the extent of the landfill, measure the levels of contamination and to fill data gaps where there is sparse information. Sample locations are shown in figure 1-4 below. Rationales for sampling activities on individual properties are included in Table 1-2 below.

All drilling and window sampling will be supervised by a GHD scientist. Correct PPE will be used to prevent staff from being exposed to contaminated soil, PID and LEL monitors will be used during the works to monitor the health of the workers on site. Full details are included in the JSEA.

At each hole, if on grassed areas, a neat square of turf will be carefully cut and laid to one side. Soil displaced during the drilling will be placed onto an impervious sheet to prevent spreading any potential contamination and will be reinstated as soon as possible and the turf will be replaced.

Table 1-2 Proposed Sampling Locations and Rationale

Property	Proposed Locations	Proposed Data	Pre-Existing Data	Notes
s 9(2)(a)	1 Window Sample (WS), 1 Hand Auger (HA)	5x Lab Tests	5x XRF Tests	XRF data only but some high readings, may be edge of fill area. No bore as access appears restricted for rig entry.
s 9(2)(a)	1 Rig-driven Bore (BH), 1 WS	7x Lab Tests	5x Lab Tests, 5x XRF Tests	Good existing data set. In area of likely filling.
s 9(2)(a)	1 BH, 1 HA	6x Lab Tests	5x Lab Tests, 3x XRF Tests	Good existing data set. In area of likely filling. House being rebuilt with limited garden area.
s 9(2)(a)	2 BH	8x Lab Tests	4x Lab Tests	Area of likely filling – House appears to be being rebuilt.
s 9(2)(a)	BH	4x Lab Tests	5x Lab Tests on lane to north, 14x XRF Tests	Good XRF data. One bore to establish fill thickness and provide extra chemical data
s 9(2)(a)	1 BH, 1 WS, 1 HA	9x Lab Tests	1x Lab Test, 13x XRF Tests	Lack of lab data on this property. XRF suggests this may be less impacted property.
s 9(2)(a)	1 BH, 1 HA	6x Lab Tests	3x Lab Tests, 1x XRF Tests	This property may be outside area of filling. Important delineation site.
s 9(2)(a)	1 WS, 1 HA	5x Lab Tests	2x Lab Tests, 11x XRF Tests	Similar to s 9(2)(a), this may be outside of area of filling and is important for delineation. No bore as access to grassed area appears too restrictive for rig.
s 9(2)(a)	1 BH, 1 WS	7x Lab Tests	5x Lab Tests, 6 XRF Tests	Key site, western half appears impacted, eastern half does not.
s 9(2)(a)	1 BH, 1 HA	6x Lab Tests	5x Lab Tests, 7 XRF	Similar to s 9(2)(a) with an apparently impacted western half and less impacted eastern half.
s 9(2)(a)	1 HA	2x Lab Tests	None	This site has very little garden area to access. s 9(2)(a) and those house beyond suggest this may be the edge of filling.
s 9(2)(a)	1BH	4x lab tests	None	Surrounding historical data suggests this property may be outside the area of filling.
s 9(2)(a)	1 BH	4x Lab Tests	2x Lab Tests, 11x XRF Tests	Good XRF data but lack of deep data. Uncertain if this property remains vacant. Key property in establishing northern extent of fill.
s 9(2)(a)	1 BH, 1 HA	6x Lab Tests	12x XRF Tests	Good XRF data but lack of depth data. XRF suggests this may be a fill-impacted site.
s 9(2)(a)	1 BH, 1 WS, 1 HA	9x Lab Tests	2x Lab Tests, 5x XRF Tests	Key site for delineation. Western half of site appears unimpacted, eastern half shows evidence of fill.
s 9(2)(a)	1 WS, 1 HA	5x Lab Tests	1x XRF	High quality garden with terraces at front. Access likely limited. Lack of XRF suggests residents may not be

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Property	Proposed Locations	Proposed Data	Pre-Existing Data	Notes
				keen on disturbance. WS located in same area as historical XRF test.
s 9(2)(a)	1 WS, 1 HA	5x Lab Tests	4x Lab Tests – All Composited	One of the more difficult sites to access. Lack of accessible locations. Historical sampling suggests fill present.
s 9(2)(a)	2 BH, 1 HA	10x Lab Tests	5x XRF Tests	Good driveway access. Lack of deep data and a key property which cuts across the likely area of filling.
s 9(2)(a)	Access Unconfirmed 1 WS, 1 HA allowed for	5x Lab Tests	No Data	House appears vacant as is for sale. Forms south-western edge of project area. Locations appear to be accessible.

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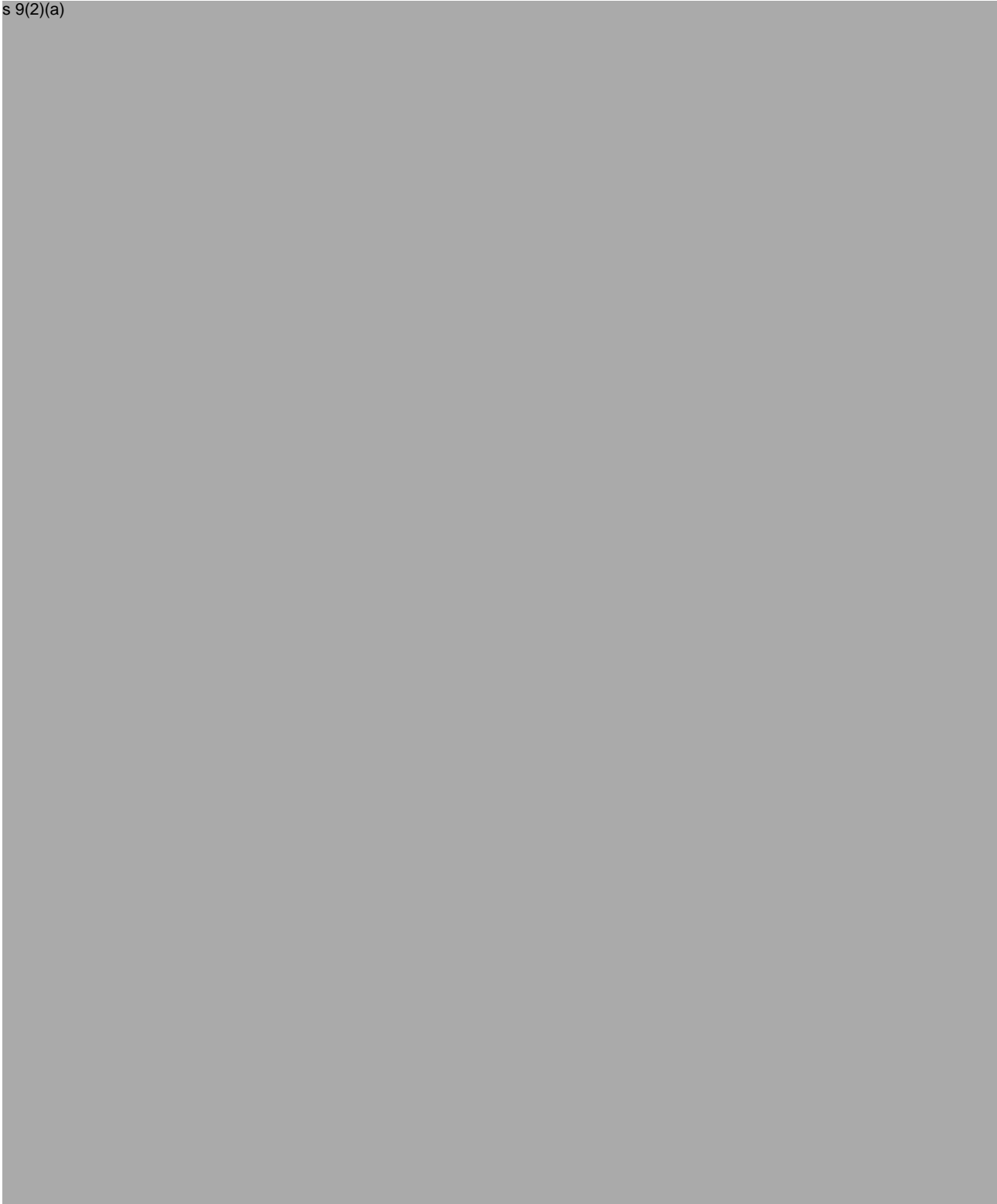


Figure 1-4: Map of Sampling Locations

1.6 Emergency contacts and site location

Emergency services contacts	Name	Phone
Ambulance/Fire/Police	Emergency Services	111
Nearest hospital	Christchurch Hospital	03 364 0640
HS & E regulators	WorkSafe	0800 030 040
Other e.g. Poisons Information Centre	National Poisons Centre	0800 764 766
Environment Canterbury Contact	Conor Parker	027 839 0101
Project Director	Mark Ballard	027 565 9861
Project Manager	Hannah Galloway	03 378 0900
Fieldwork Lead	David Jackson	027 250 5817
GHD fieldwork phone	Mark Ballard / Hannah Galloway / David Jackson	022 029 2110

A map showing the location of the nearest Hospital Emergency department is shown in Figure 1-5 below

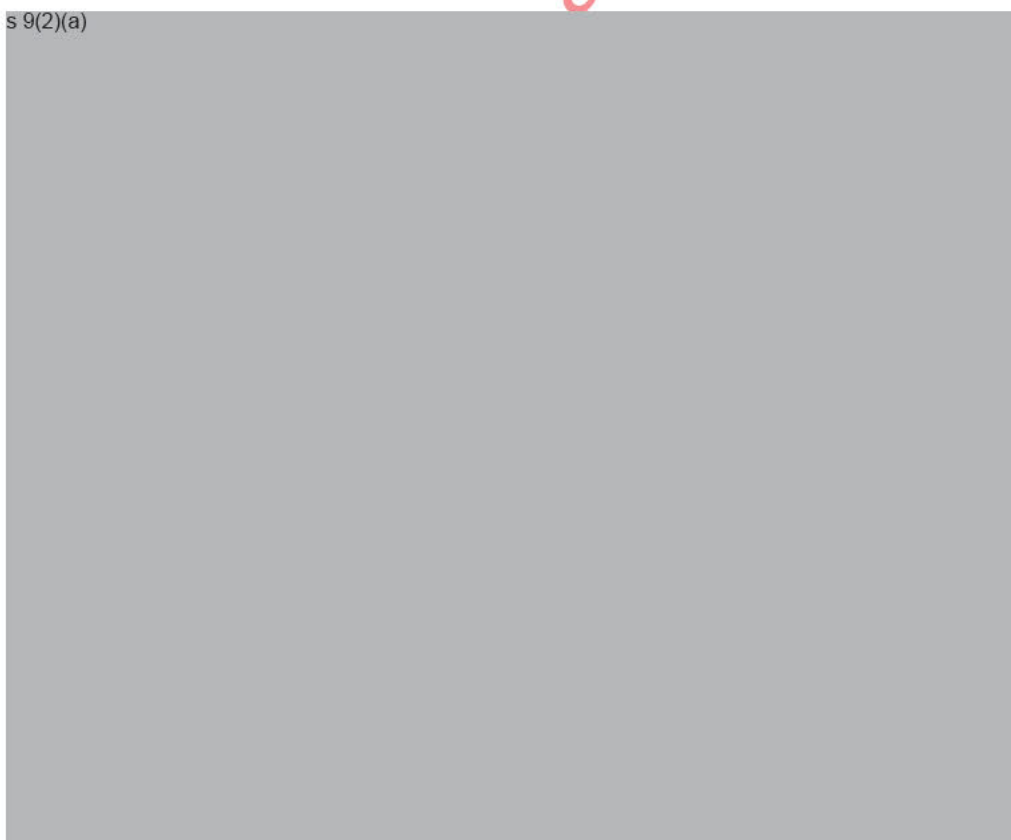
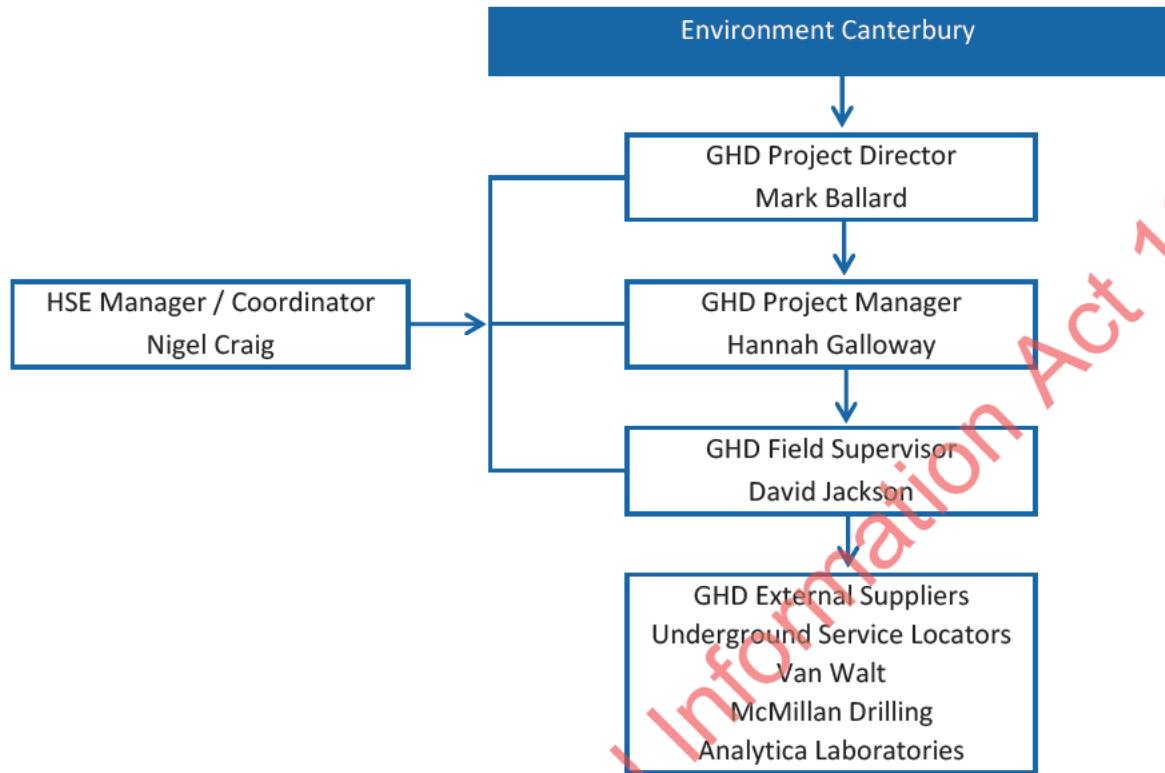


Figure 1-5: Route from site to Christchurch Hospital

1.7 Organisational chart



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2. Leadership, commitment and accountability

2.1 Health, safety and environment policy

The Project HSE Plan has been established to facilitate works undertaken which have the potential to impact health, safety and environment. The works will be undertaken in a manner that meets or exceeds the intent of:

- Jurisdictional HSE Legislation, regulations and relevant advisory standards, Codes of Practice (CoP) and guidance notes.
- GHD Health, Safety and Environment Policy.
- GHD Health, Safety and Environment Management System.
- Client or site specific Health, Safety and Environmental (HSE) requirements.

2.1.1 Project health safety environment objectives and expectations

Consistent with the GHD Health, Safety and Environment Policy, the HSE objectives and expectations for the project are:

- To give HSE priority over all our activities and to intervene when an unsafe act or unsafe condition is observed.
- Zero harm to project staff, external suppliers and visitors, zero impact to the surrounding environment and community and zero damage to property (include plant/machinery and equipment).
- To identify and implement HSE legislation, regulations and codes of practice applicable to the project.
- To establish and maintain operational procedures that identify hazards associated with the work carried out and to implement effective mitigation measures.
- To provide adequate emergency response to incidents and to ensure that all incidents are properly investigated and reported and appropriate corrective/preventative actions are taken and evaluated.
- To outline key performance indicators to monitor performance and report HSE matters to all relevant stakeholders.
- To ensure roles and responsibilities are clearly identified and communicated to each individual involved in the project.
- To establish project specific training requirements to enable all stakeholders to be competent to perform tasks safely, to be aware of and understand HSE hazards and risks associated with their work activities and the control measures necessary to manage them.
- To engage external suppliers who share the values outlined in this Project HSE Plan.
- To implement an inspection and monitoring program to ensure compliance and continuous improvement.

- To create and nurture a positive HSE culture that empowers and supports project staff in accordance with this Project HSE Plan.

2.2 Management leadership and commitment

Everyone on the project has a role to fulfil in relation to this Project HSE Plan, through active participation and prescribed activities for their position.

Managers will demonstrate leadership in all aspects associated with the project, ensure adequate resources are in place to effectively manage HSE and will not accept behaviours that could place people or the environment at risk of harm or injury.

Organisational accountability for achieving the requirements of this Project HSE Plan rests ultimately with the project manager, project director and Operating Centre Manager.

2.2.1 GHD HSE management

GHD is committed to embracing a culture where health, safety and environment is “top of mind”. Our approach is to provide a healthy and safe workplace for our people, clients, visitors and business partners (our stakeholders), minimising injury and illness and to minimise environmental impact. We strive to improve the social, economic and environmental performance of our operations in order to meet or exceed the objectives of our Health, Safety and Environmental (HSE) Policy.

GHD is certified under International Standards (ISO) and AS/NZS and committed to continual improvement by aligning with the Plan-Do-Check-Act model as referenced in:

- OHS 18001: Occupational Health and Safety Management Systems
- ISO 14001: Environmental Management Systems

GHD’s project management systems are also certified to ISO 9001: Quality Management Systems.

Under GHD’s Health, Safety and Environment Management System, everyone within GHD, including senior management, are required to participate in the operation and continual improvement of the system.

Responsibilities and accountabilities have been defined for all management and staff and are detailed throughout each of the documents within the system.

Elements of management responsibility include:

- Appointment of sufficiently skilled and experienced HSE people.
- Monthly HSE reporting and discussion at Operating Centre Management group meetings.
- Review and achievement of GHD’s HSE Index.
- Regular internal and external HSE compliance verification to confirm the suitability, adequacy and effectiveness of our HSE Management System.
- Regular review of Project HSE Plans to verify project planning, monitor delivery of quality HSE outcomes and confirm that HSE is being adequately managed.
- Monthly reviews of incident, near miss and hazard reporting and investigations, including corrective action close out rates.
- Communication of lessons learnt.
- Participation in HSE consultative mechanisms.

- Engage people in HSE discussion (HSE Briefings).
- Undertaking site inspections to identify improvement opportunities (HSE067 Management JSEA Site Review).

2.3 GHD SAFEguards

The GHD SAFEguards are a cornerstone of GHD's approach to managing Health and Safety and have been identified as a result of a risk assessment of GHD operations. The GHD SAFEguards focus our project team's attention on our highest forms of risk that if left uncontrolled have the potential to seriously injure or cause the fatality of a staff member or external supplier. This procedure identifies critical controls that must be in place prior to commencing any work so that we can maintain our HSE goal – *SAFE YOU, SAFE ME, SAFE GHD*.

All project staff will follow the requirements of GHD SAFEguards. These are illustrated on next page.

2.4 Stop Work Authority

All GHD staff and GHD subcontractors are empowered and expected to stop the work of themselves, co-workers, subcontractors, client staffs, or other contractors if any person's safety or the environment are at risk.

Stop Work Authority (SWA) can be the result of an unsafe condition and/or unsafe act, so all these terms are used in this policy statement. SWA also includes if anyone on the site has questions or is unclear of established standard for safety, health and the environment at any time in the work process.

No repercussions will result from this act.

When a SWA is implemented, no work will resume until all issues and concerns have been addressed.

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GHD SAFEguards

CAUTION

CAUTION



Always develop a Communication Plan when travelling into **remote or isolated areas** and an approved Travel Risk Management Plan when travelling into **high or extreme risk destinations**



Always obey the road rules (e.g. speed, use of mobile phones, influence of alcohol and/or drugs etc.) and plan to avoid fatigue when **driving**



Always make sure that **equipment/machinery** is in a safe condition and you have the necessary training and competence before use



Always obtain authorisation through risk assessment, training and entry permit before entering a **confined space**



Always isolate **equipment or plant** before starting work and never remove a personal danger/isolation tag belonging to another person



Always obtain permission prior to entering an **excavation or barricaded area**



Always obtain authorisation prior to entering a **rail corridor** or work area within the corridor



Always gain operator visual acknowledgement and maintain safe working distances when entering areas with operating **traffic, mobile plant or machinery**



Always identify the location of **underground services** before disturbing the ground and **always** maintain safe working distances (and authorisation where applicable) when working in the proximity of **overhead utilities**



Always when **working at heights** ensure you are appropriately trained, wear specified fall protection equipment and don't leave tools or equipment unsecured

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2.5 Behaviour Based Management

The strength of our HSE culture relies on the engagement and participation of all people and especially management to not only “talk up” HSE strategies, but to illustrate leadership and maintain relationships with our people that are supportive with the HSE process.

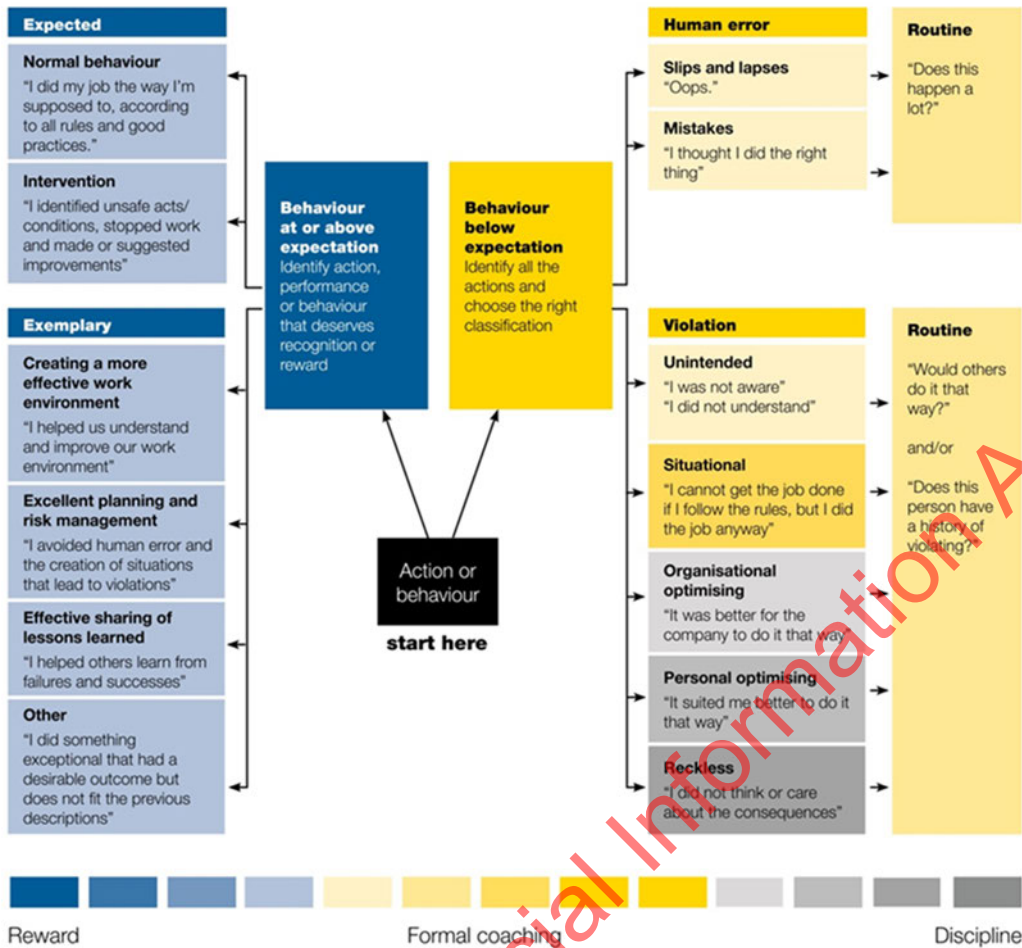
All project staff:

- Will hold personal safety and environmental stewardship as core values.
- Ensure that each person on this project feels responsible for the safety of their co-workers as well as themselves, and the environment in which they work.
- Ensure that each person on this project is willing to intervene when an unsafe act or unsafe condition is observed.

The SMART process provides the framework to enable the identification of behaviours that align or misalign with GHD expectations. SMART behaviours (desired or undesired) will be identified through:

- Workplace inspections, project reviews, management reviews of JSEA implementation.
- Incident investigations - where group or individual behaviours are identified as a contributing factor.
- Formal reviews and audits - that identify failures to meet accountabilities or highlight exemplary behaviour.
- (And where required by clients in specific industries e.g. Oil and Gas) SMART observations - focussed on specific high risk environments

Identified behaviours (desired and undesired) will be managed in a consistent manner using the guidance within the [GHD-SOP-HSE-004 SMART Behaviours](#) including the SMART Behaviour Decision Tree illustrated below:



2.5.1 Consequence management

GHD commits to prompt action where project staff behaviours are identified that affect the health and safety of staff and the project.

2.6 Responsibilities and accountabilities

2.6.1 Project director – Mark Ballard

As project director Mark is responsible for controlling the overall delivery of this Project HSE Plan and ensuring compliance with GHD’s HSE Management System requirements for the project. The project director will identify and provide resources for the Project.

Specifically, the project director will:

- Ensure only trained and competent people are assigned project roles.
- Ensure sufficient planning and resources are assigned to the project.
- Validate and approve site specific JSEA.
- Serve as a conduit for shared learning and communication between project and OC.
- Verify compliance of the Project HSE Plan with GHD expectations and requirements.
- Identify and communicate changes in GHD’s HSE requirements.

- When not part of the site project team, undertake a *Management JSEA Site Review* to review to demonstrate visible leadership and active project HSE management through verification of the appropriateness of JSEAs and their implementation on site.

2.6.2 Project manager – Hannah Galloway

The project manager is responsible for the implementation of this Project HSE Plan. The project manager will delegate site delivered roles and responsibilities to a “field supervisor”, (David Jackson) however retains overall responsibility for practical implementation of HSE on the project.

Specifically, the project manager will ensure:

- A project specific Project HSE Plan is developed where requested by the client and for all principal contractor engagements.
- Project staff are made fully aware of their HSE responsibilities and are familiar with the contents of this Project HSE Plan.
- Only trained and competent staff are assigned site based work and project specific external and internal (e.g. e-learning) training is completed. Refer to the OC HSE Training and Knowledge matrix.
- *Project Safety and Environment Analyses (JSEA)* are developed for each site activity undertaken on the project (refer to Section 4.6), reviewed and approved by PD or suitably skilled and experienced delegate before site based works commence and affected staff inducted in their requirements.
- *Pre-work assessment* undertaken daily or when site conditions change with GHD’s project team, external suppliers and visitors to review *JSEAs* and document site specific conditions not reflected in *JSEAs*.
- *Checklist Site Inspections* are conducted as required based on risk.
- HSE injuries, incidents, near misses or hazards are reported in IRIS and investigated in accordance with the *Business Management Procedure*, this plan and any specific requirement of the client.
- Project related HSE actions related to inspections, audits, Project HSE Plan Reviews, Incidents and hazards are completed within agreed timeframes and monitored in IRIS for ongoing suitability.
- Delegated “field supervisor” is sufficiently trained to deliver HSE duties on the project.
- External suppliers engaged by GHD to undertake site work are appropriately reviewed prior to them commencing site work and managed in accordance with the requirements of this plan.
- Project HSE meeting minutes are prepared and disseminated to agreed stakeholders.
- When not part of the site project team, undertake a *Management JSEA Site Review* to demonstrate visible leadership and active project HSE management through verification of the appropriateness of JSEAs and their implementation on site.

2.6.3 Project team – David Jackson and Pauline Jurczak

Project staff are responsible to conduct their activities in accordance with this Project HSE Plan and supporting initiatives.

Specifically project staff will:

- Comply at all times with the HSE requirements of GHD – including safe work practices and procedures.
- Take reasonable care for their own safety, health and welfare and that of any other person or environmental aspect that may be affected by their acts or omissions while at work.
- Actively participate in project related inductions and development and maintenance of project risk management documentation, including review of the *Management JSEA Site Review* during *Pre-work HSE Assessment*.
- Conduct equipment maintenance checks to ensure equipment is fit for purpose and safe to operate.
- Use and maintain equipment, machinery, tools and other resources in a safe and appropriate manner.
- Use and maintain supplied Personal Protective Equipment (PPE) in an appropriate manner.
- Report all HSE injuries, incidents, near misses or hazards to the project manager as soon as practicable and within 24 hours of the event occurring.
- Stop works if conditions or equipment used are considered to be unsafe.

In accordance with the *Stop Work Authority*, project staff have a right to stop work or refuse to work in situations that may cause HSE harm, and immediately bring these situations to the attention of those at imminent risk and to their direct Field Supervisor or Project Manager.

2.6.4 Health, safety environment manager/coordinator – Nigel Craig

The responsibility of the HSE Manager / Coordinator is to provide advice and support to the Project Management Team and monitor the Project HSE Plan in adherence with GHD and client HSE expectations as part of a wider OC project review program.

The HSE Manager / Coordinator will:

- Provide specific HSE or community related advice where required, and provide advice with regard to GHD and Operating Centre (OC) HSE expectations.
- Monitor site compliance with Project HSE Plan and JSEA and Pre-work Assessment through Site Inspections, Project HSE Plan Reviews and Management JSEA Site Review.
- Support the Project Managers and project staff with the reporting and investigation of HSE injuries, incidents, near misses or hazards.
- Prepare, review and disseminate HSE Alerts.
- Assist in the review of HSE performance reports including analysis and communication of HSE trends.
- Report to the project director and project managers on HSE issues of concern.
- Deliver project specific information sessions and training, where required.
- Actively promote, communicate and educate to achieve a safe work environment for all project staff.

2.7 Training and competency

GHD recognises that all project staff must receive the necessary HSE training to ensure adequate understanding of this Project HSE Plan and critical hazards associated with the project. The *OC Training and Knowledge Matrix* details the training expectations for each service group based on the information identified within the OC HSE Risk Assessment.

All project staff must have their licenses (e.g. Drivers) and certificates (e.g. construction induction, plant/machinery) available for inspection prior to commencing work on the project and at other times during the project.

2.7.1 Mandatory training requirements

Project managers are to use the *OC HSE Training and Knowledge Matrix* to verify project specific training requirements before the commencement of work on the project. They are to ensure that all project staff training records (including subcontractors where required) illustrate completion and currency of training associated with the hazards of the project and any client or project specific requirements. All such records will be managed on the project file and GHD staff training records will be maintained in Business School Learning Management System.

Project staff must not carry out any kind of high risk work activities unless they have undertaken the appropriate GHD training and where applicable hold an accreditation/licence for the type of work being conducted. Health, safety and environment project plan induction

HSE Managers / Coordinators will coordinate mandatory inductions into this Project HSE Plan for project staff prior to conducting work on the project. The induction will convey essential Project information including:

- Information on the requirements and expectations included in this Project HSE Plan.
- Information on the specific roles and responsibilities of project staff working under this Project HSE Plan.
- Completion and attainment of jurisdictional construction induction accreditations etc.
- Communication of key Project risks and controls identified in the OC HSE Risk Assessment.
- Records of completed Project HSE Plan inductions will be captured on *the Induction/Briefing Register* and recorded in the Learning Management System (LMS) by the OC Business School coordinator.

The HSE Manager / Coordinator will also ensure the induction information is maintained on the *OC HSE Training and Knowledge Matrix* and confirm the validity of the licenses, certifications and accreditations relevant to the project.

All staff on a site being managed by another party must comply with the requirements of the specific site's induction at all times and GHD are responsible for site inductions when engaged as the principal contractor.

The *Project HSE Plan deliverables checklists (P2, P3, P4)* provides a useful reference for Project HSE Plan deliverables identified within this project plan.

Site specific HSE induction will be delivered by GHD where required by the client or where GHD is the principal contractor. This induction is to be delivered to GHD's project team, external suppliers and visitors to the site. Refer to Section 6.2 – Information transfer for further information.

3. HSE planning, performance and management

3.1 Regulatory requirements

GHD will identify and comply with all relevant HSE related legislation and any project specific requirements (e.g. client or site based) during the project planning phase.

Access to updates on legal and other relevant material will be available through the internet and on-line subscriptions (i.e. SAI Global, State Law Publisher, State and National Regulators, electronic publications, etc.). The HSE Manager / Coordinator is responsible for the identification, notification and distribution of new or amended HSE legislation and related GHD – specific HSE documentation.

New or amended legal and other requirements material will be identified through on-line subscription notifications and implications are evaluated, replicated within this Project HSE Plan and JSEAs and communicated accordingly.

In the event there is a conflict between this Project HSE Plan, and that of the relevant jurisdiction or client, project staff will follow the most stringent standard.

3.2 Performance objectives and targets

Project Key Performance Indicators (KPIs) for all GHD's projects are outlined below:

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Table 3-1 Project key HSE performance indicators

Key performance objective	Target
Recordable HSE Incidents and near misses	Zero recordable Serious or Serious Potential Incidents or LTIs, MTIs and Significant Environmental Incidents
GHD SAFEguards	Zero non-compliance with GHD SAFEguards
Project HSE documentation reviewed and approved by PD prior to commencement of site works and six monthly thereafter	100 % compliance
GHD and Client Site HSE Rules	100 % compliance
GHD Alcohol and Other Drugs requirements	100 % compliance
All incidents reported within 24 hours and entered into the IRIS as soon as practicable	100 % compliance
Project team attendance and participation in daily pre-work assessments	100 % compliance

Additional performance indicators and targets may be monitored on request of the client.

Where requested by the client a HSE report will be compiled by the project manager to report on summarised performance information for the project under the contract at agreed intervals.

Any improvements or actions identified will be captured within IRIS.

Clear communication of Project HSE expectations and performance will be provided to all project staff through:

- The Project HSE Plan
- The Project induction/briefing process [Project Briefing Sheet](#)
- JSEA and pre-work assessments
- Position, role, hazard based, jurisdiction or client specific training
- Project HSE Plan Reviews
- Incident reports and investigation outcomes
- Audits
- Electronic communications
- HSE Alerts and HSE Briefings

3.3 Consultation and communication

3.3.1 Consultation

In accordance with the *Business Management Procedure*, project staff will be regularly consulted about their work activities and the potential HSE hazards or risks that may be present.

HSE issues raised by the project team (including external suppliers) will be recorded (in IRIS where appropriate) and considered by the project manager and OC Management in a transparent and consultative manner. Project staff will be provided with feedback and the outcomes of any decision reported to project management team.

3.3.2 Project management HSE meetings

GHD recognises that a fundamental aspect to establishing and maintaining a positive HSE culture on the project is effective communication and consultation with project staff. All project staff under the control of GHD will be provided with clear direction and guidance with regard to HSE expectations. This will be provided through HSE meetings as described below. Additional meetings to these described below may be required by the client.

Pre-mobilisation meeting

The Project Manager will hold a pre-mobilisation meeting prior to project staff (including external suppliers) mobilising to site. All relevant stakeholders, including an OC HSE representative where appropriate, will attend these meetings. The intent of the meeting is to ensure that critical HSE, logistical and technical elements have been considered and where applicable implemented (E.g. JSEA Briefing). Records of these meetings are to be maintained on a *Project Briefing Sheet*.

Daily Pre-work HSE Assessments

A daily Pre-Work Assessment will be conducted by the Field Lead – David Jackson before any works commences on site.

All site based staff (including external suppliers and visitors) will attend a pre-start meeting for the purpose of discussing:

- Previous day/s activities and HSE issues (if any)
- Scheduled activities for the day
- Any changes to the site specific scope of work
- Any HSE matters relevant to the day's activities
- Any relevant HSE Alerts or lesson learnt reports
- Provide feedback from any hazard, observations, near misses and incident reports
- Records of these meeting will be captured on *JSEAs*

Where GHD's role on the project is client's representative and has HSE obligations, the project director, project manager and other nominated project staff will attend regular project management meetings for the duration of the project for the purpose of discussing:

- HSE performance, including incident, audits and corrective/preventative actions.

- Recently released and relevant previous HSE communications (e.g. HSE Alerts, HSE Briefings etc.).
- Contract progress.

Meeting minutes will be taken and circulated to all involved parties

3.3.3 HSE Alerts and HSE Briefings

HSE Alerts will be distributed by the Project Manager and/or awareness sessions will be held for all project staff (including GHD external suppliers) in the event there is a:

- Serious potential incident/near miss
- A serious incident (e.g. MTI, LTI, Major Environment, Significant Environment)
- HSE developing trend based on incident or hazard reports, suggestions or observations
- A HSE Briefing will be distributed where there is a:
 - Relevant change to project scope or this Project HSE Plan
 - New HSE legislation impacting the project
 - Client request to circulate an internal HSE (or contract) alert to the project management team

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4. Risk management

4.1 Legal and other requirements

Electronic externally hosted HSE legal requirement subscriptions provide our project teams with quick and easy access to legal and other requirements on a hazard by hazard basis. These are to be used by staff when developing risk management documentation such as [JSEAs](#)

4.2 Hazard guides

Hazard Guides provide the summary information and GHD's recommended approach to managing HSE specific hazards and will be referred to when developing GHD risk management documentation (e.g. [Risk Assessment](#) and [JSEA](#)). See individual topics listed in Section 5 of this Plan for details.

4.3 Project site HSE rules

All project staff (including external suppliers) under GHD control will comply with and be communicated the site HSE rules outlined below and in JSEAs and any amendments will be communicated via the Pre-Work Assessment process. The GHD project team will also adhere to site HSE rules developed by the client or site controller. All project team members will implement the following GHD rules:

- **Project HSE Plan** – Comply with the requirements of the Project HSE Plan, associated processes and client requirements
- **Risk Management** – Follow all HSE risk controls identified in the risk assessment and/or JSEA
- **Pre-Work Assessment/Induction** – Attend induction and/or Pre-Work Assessment prior to the commencement of work
- **Training** – Hold the relevant certificates of competency, licences and training to safely undertake the activity
- **Incident/Hazard Reporting** – Report all incidents/hazards (including near miss incidents) immediately to the Project Manager and record in IRIS
- **HSE Breaches** – Correct identified HSE breaches of legislative requirements without delay
- **Alcohol and Other Drugs** – Australia/New Zealand staff under the control of GHD must be fit for work in accordance with the requirements of the [HSE-001 Alcohol and Other Drugs \(AOD\)](#). All staff must adhere to the AOD programs adopted by the client or Site Controller, where applicable
- **Plant/Machinery and Equipment** – only to be used for its intended purpose and in accordance with manufacturer's instructions
- **Personal and Environmental Protective Equipment (PE)** – All project staff will wear PPE and use environmental protective equipment as per the requirements of the JSEA
- **Housekeeping** - High standards of housekeeping are to be maintained to create safe access and egress, including access to emergency equipment, remove slip and trip hazards and ensure the safe storage of materials
- **Practical Jokes** – Never engage in practical jokes that may put people's safety at risk

Note: Activity Specific site HSE rules are captured in the control measures section of the JSEA.

4.4 Project safety and environmental analysis (JSEA)

JSEAs are developed in consultation with the project team and are approved by the project director for all site construction activities, with Project HSE Plan Reviews undertaken in the HSE Database. All site activities will be conducted in accordance with the JSEA.

JSEAs under the control of GHD identifies the following information:

- Work activity
- Sequential task steps
- Hazard identification and potential risks
- Risk rating for identified hazards
- Risk control measures
- Allocation of responsibilities for control implementation
- Necessary training
- Legislative compliance requirements
- Details of statutory and non-statutory certificates, permits and approvals
- Emergency arrangements
- Personal and environmental protective equipment
- Inspection and maintenance requirements
- Approval and communication acknowledgement of the JSEA - It is the responsibility of the Project Manager to confirm that project staff have completed the relevant training and have the required protective equipment in accordance with the JSEA prior to commencing activities on site.

JSEAs are to be reviewed every six months or if the activity, work environment, equipment or staff change, and be approved by the project director and communicated to all relevant stakeholders via Pre-Work Assessment.

JSEAs will be signed by the GHD Site Project Team only and maintained on site until work is complete. External suppliers and visitors are not to sign on to JSEAs as they are not privy to GHD referenced documents e.g. Hazard Guides or GHD training requirements etc. in the JSEA and should have their own risk management documentation.

A copy of all approved JSEAs will be made available to involved employees provided to the entity controlling the work site – e.g. Client, Principal Contractor etc.

A copy of all signed JSEAs and pre-work HSE Assessments can be found on the Project File and must be maintained on file for a minimum of 2 years where an incident occurs during its implementation.

4.5 Pre-work assessment

Pre-Work Assessment is the daily consultative methodology used by GHD to review the JSEA, identify new HSE hazards or altered conditions that may affect the safe delivery of site activities and communicate this information to the project team under the control of GHD.

The delegated Field Supervisor is responsible to deliver the Pre-Work Assessment in consultation with staff under the control of GHD (including external suppliers and visitors).

A Pre-Work Assessment is to be undertaken each day prior to commencing work and at any other times during the day where site conditions have altered (e.g. due to weather conditions, incident occurring or external controls affecting site etc.) and captured on the Pre-Work Assessment within the JSEA.

Completion of Pre-Work Assessment may be deemed unnecessary for Client's Representative engagements where GHD has a constant daily site presence and participate in the Site Controller's daily Pre-Work Assessment Process.

4.6 Safety in design

Where applicable (i.e. within scope or legally required), HSE risks will be controlled through incorporation of HSE risk mitigation within engineering design of facilities, plant, systems and structures. GHD commits to:

- Eliminating or mitigating HSE hazards and risks through design processes to control HSE impacts at a level that is considered to be ALARP.
- Ensuring staff are trained in Safety in Design principles and practice.
- Consideration of HSE elements of designs as part of decision making in the design process.
- Communication and consulting with identified stakeholders during the design lifecycle.
- Encouraging outcomes or engineering/design activities that are considered to be reducing HSE risks to a level that is ALARP.

Where client requests (as part of project scope), GHD will endeavour to reduce impact on the environment through the design process using guidance contained within *Environment in Design*.

4.7 Management of change

Project staff are required to formally assess the impact of changes to the Project and changes in the work environment. Any changes to the Project, project staff, equipment, site conditions etc. will have the HSE implications assessed and approved by the Project Manager in accordance with the *11.01.01 Practice Management Procedure*.

Any such changes should be discussed at the next scheduled Pre-work Assessment and/or prior to re-commencement of work. Changes will be incorporated into the site specific HSE documentation.

Major changes that affect the Project will be discussed at a Project Management level and with the client and then communicated to project staff through a HSE Briefing or more widely via a HSE Alert.

Actions arising from an approved change will be registered in IRIS. The HSE Manager / Coordinator is responsible for monitoring of corrective actions (corrective or preventative) in consultation with the project director and project manager.

4.8 Simultaneous site activity management

Where two or more site operation activities occur simultaneously, the planning, execution and HSE management of the activities will be managed through a simultaneous site activities process.

Simultaneous site operation activities may be identified by the following issues:

- Schedule interfacing (simultaneous timing)

- Physical interfacing (simultaneous locations)
- Failure interfacing (an incident occurring during one activity has the potential to impact another activity)
- Site interfacing (activities occur close to other sites/operations)
- Any other combined/simultaneous activity occurring in the area of operations which could compromise the outcomes of the activity

Where **minor** simultaneous operations are identified, GHD staff and other stakeholders (e.g. external suppliers, client), involved in the activities will discuss the simultaneous activities (either pre-mobilisation or on-site) that may affect each operation, so that HSE impacts are minimised. Details can be recorded on the *Pre-Work Assessment* or *Risk Assessment*.

4.9 Crisis and emergency management

The *GHD-SOP-HSE-010 Crisis and Emergency Management* regulates GHD'S principles for management of all crisis's and emergencies involving our operations, or where GHD has legal, ethical or community responsibilities and details management at 3 levels:

- Local response
- Emergency response – Regional Management
- Crisis Management – Executive Management

Possible sources of emergency will be identified as part of the project risk management activities and emergency planning will be detailed in the project specific HSE documentation (e.g. Plans, JSEAs, Induction material etc.).

Where GHD maintains responsibility for HSE on site, extreme HSE risk exists for specific sources of threat or where the client requests, GHD will develop detailed plans for the management of specific types of emergency (e.g. cyclone, bush fire etc.)

4.9.1 Evacuation procedure

Emergency arrangements for the site will be captured as part of the JSEA and all staff briefed prior to starting activities on site. Where deemed appropriate by the nature of risk or by client requirements, a specific threat emergency plan (e.g. cyclone/hurricane) will be developed and implemented on the project.

In the event of an emergency, staff members are responsible for notifying the Project Manager or delegate immediately to initiate the initial response. All members of the project team will assemble at the nominated assembly point and wait for further instruction from the Field Supervisor or delegate.

No staff under the control of GHD will re-enter the site until:

- Given formal all clear by emergency services/Regulator (where applicable).
- The conditions resulting in the emergency have been corrected and all staff have been formally notified of the corrective actions taken.
- The hazards have been reassessed/documented and control measures put in place.
- The JSEAs have been reviewed and updated, where applicable.
- A Pre-Work Assessment has been delivered on any changes in project conditions.

GHD will ensure that all identified HSE hazards and associated risks are assessed and managed through effective risk management processes in accordance with *HSE-01 Business Management*.

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5. Key HSE issues

GHD will implement risk management systems that focus on early identification, assessment, and continuous tracking and mitigation of risk. The below information is aimed at describing core hazard management requirements and help inform the development of risk management documentation (e.g. JSEA and Risk Assessment) and ongoing hazard management.

GHD HSE Guides provide Project teams with information that assists in the development of project HSE Risk Management documents and identifies the key control strategies to reduce risk.

5.1 Alcohol and other drug testing

Australia/New Zealand staff under the control of GHD must be fit for work in accordance with the requirements of the (AOD) Procedure and adhere to the AOD programs adopted by the Client or Site Controller, where applicable.

5.2 Asbestos

Asbestos has been identified on two properties. It is assumed that the likelihood of asbestos in the fill is low, however, if asbestos is identified during works, the following procedure outlined in the JSEA will be implemented:

Measures will be implemented to control and/or minimise the health and safety risks associated with working with asbestos and only activities for which we are appropriately licensed and competent will be undertaken. GHD will stop work and contact the project manager. They will work together to assess the risk posed. Work will only commence when appropriate PPE is in place for all team members.

5.3 Barriers and barricades

The mini-drill rig, window sampler and excavations are some of the most significant hazards on the site. Barricading will be constructed to prevent people, plant or equipment entering areas where fall potential, overhead hazards exist, machinery is operating or where access needs to be limited to authorised staff only.

Plastic tape, witches hats, flagging and other materials may only be used in this application as is applicable with the risk presented.

Guards will not be removed unless the equipment is isolated and the equipment cannot re-start until guards are reinstalled.

5.4 Electricity and overhead power lines

The conditions must be met on all occasions:

- a person coming into direct contact with an electrical part
- any operating plant or vehicle coming into direct contact with an electrical part
- a person coming within the exclusion zone for the person for an electrical part
- any operating plant or vehicle coming within the exclusion zone for the operating plant or vehicle for an electrical part

- a person coming into direct contact with an underground electrical service.

Electrical tools and equipment used on site will be visually inspected prior to use, tested and tagged where it is jurisdictionally required and maintained in GHD's *Electrical Register*.

All work in the vicinity of electrical services and overhead power lines will comply with jurisdictional and utility owner and client requirements.

The higher risk in terms of overhead power lines will be from the mini-drill rig, as the window sampler will not exceed approximately two metres above ground level. The mini rig is however of a similar height, but each drilling location will be assessed individually from a HSE risk perspective.

5.5 Excavation and surface penetration

All excavation and surface penetration activities will comply with jurisdictional and client requirements.

Staff involved in excavation and surface penetration activities will be trained in the hazards associated with these activities.

As per GHD policy, all excavations, penetrations and break-ins deeper than 150mm (including the installation of star pickets) are required to have project director approved subsurface / intrusion works documentation in place prior to any excavation, break in or penetration work starting. This will include all bores dug by mini-drill rig, window sampler and hand auger.

5.6 Fatigue

Fatigue will be considered within each project and all project staff will be monitored for fatigue from the beginning of the Project. Two processes may be used to monitor work hours of GHD employees and their external suppliers.

Project Team members are responsible for notifying their supervisor if they are fatigued to the point of not being able to perform their duties safely.

Effective controls will be implemented to minimise the risks associated with fatigue, including the following work hours guide:

Table 5-1 Work hours guide

Work hours	General provisions
Up to 12 hours	Staff member assesses own fitness for work.
Total hours of work	No staff member permitted to work more than 16 hours in a 24-hour period. Individuals not to work above 14 hours per day for more than 5 days. The total hours worked by an individual should not exceed an average of 65 hours per week over a four-week period.
Break between consecutive shifts	A minimum break of 10 hours between consecutive shifts worked – where this cannot be achieved project director and HSE Manager / Coordinator approval is required prior to returning to work.
Call back	No more than one call back in any 24-hour period.
Shift arrangements	When supervising activities, maximum days will be 10 on – 4 off. Project director or project manager and HSE Manager / Coordinator approval (based on risk assessment) required to work outside these arrangements.
	When undertaking manual activities – 14 days on – 7 off. Project director and site HSE manager approval (based on risk assessment).

5.7 First aid

GHD will ensure that a sufficient number of first aid officers are trained to manage foreseeable injuries which may occur.

GHD will make sure external suppliers working within our area of responsibility have sufficient first aid officers in the work group at all times.

First aid kits satisfying jurisdictional requirements must be provided and maintained by GHD and its external suppliers on site and in all motor vehicles. Content of these is to be audited by the nominated site first aid officer.

First aid facilities are for the immediate treatment of minor injuries– all injuries will be reported, treated by the site first aid officer and recorded before the end of the days' work.

In the case of simple wounds and injuries, a qualified first aid officer will give treatment and if required, referred to the nearest medical facility for further assessment and/or treatment.

All incidents involving first aid will be recorded on the [First Aid Register](#) and also in IRIS – to be investigated.

5.8 Flora and fauna

A site walkover has identified a property with beehives and another property with a dog.

Risks from these include allergies, stings and bites, and potential interference with operating machinery. Staff should endeavour to stay away from animals where possible, ensure no team members have any allergies, and the dog is under control.

Activities that present risk to natural locally occurring plant and/or animal life (flora and fauna) will be managed to ensure such aspects are preserved and remain undamaged.

5.9 Housekeeping and signage

A strong focus will be placed on the standard of housekeeping on Project sites and regular inspections of housekeeping will be carried out. GHD's project manager/field supervisor reserves the right to stop works where housekeeping is deemed to be below the required standard.

Signs will comply with the relevant jurisdictional standard and be put in place wherever there is a requirement to warn staff that a hazard or some other issue exists or where required to provide principal contractor details.

5.10 Return to work/injury management

All injury management and return to work activities will comply with jurisdictional requirements.

OC return to work coordinators will manage all injuries to our people which require off site treatment. It is a part of their role to follow up and communicate to GHD's project manager the status of injury treatment and the RTW programs for injuries which occur on the project.

Return to work coordinators will be suitably qualified (where required) to manage injured employees return to full duties and to inform appropriate stakeholders on an agreed basis of the injured person progress back to fit for work status.

5.11 Manual handling

Manual handling risks have high injury potential and controls should feature prominently in task planning. The most significant risks include moving the window sampler and hand auger, containers of soil samples and moving of other equipment.

Training and education in regard to manual handling practices and procedures will be conducted for all staff who have the potential to lift, carry, move or in any way manually handle any object, equipment or part.

5.12 Noise

GHD will manage the risk of exposure to noise and vibration hazards. Based on risk, noise controls on the project are:

- The use of Class 5 Hearing protection during drilling and window sampling work.

5.13 Personal protective equipment (PPE)

In controlling hazards the use of PPE is the least favoured and effective option and must be accompanied by adequate training and education.

All equipment must be worn in the manner in which designers/manufacturers intended and as per the instruction received, in the use, care and maintenance, at the time of issue.

The PPE requirements may vary based on the project; however the following minimum standard is for all GHD's projects when activities on site are undertaken:

- Long trousers and long sleeve shirt (high-visibility colour) with reflective striping on the front, back and arms (sleeves rolled down and fastened at the wrist)
- Hardened toe cap safety footwear (ankle high lace-up, no elastic sided boots allowed)
- All other PPE requirements identified in the JSEA

PPE will be stored and maintained as per manufacturer's recommendations.

5.14 Plant/machinery and equipment

Plant and Equipment such as the mini-drill rig and window sampler used on GHD's projects will undergo inspections by competent people prior to and during mobilisation. Equipment guarding will comply with relevant jurisdictional standards and will be in place during equipment operation.

The hazards associated with working around plant/machinery will be effectively managed through the risk assessment process, this may include introduction of:

- Exclusion zones around plant/machinery
- Physical guards, cut-outs and emergency cut-off points
- Spotters and observers
- Vehicle movement procedures
- High visibility garments

All staff undertaking activities in the vicinity of moving plant/machinery will be trained in the associated hazards.

5.15 Remote, Isolated or Lone Work

Remote or isolated work is work that is isolated from the assistance of other people because of the location, time or nature of the work being done. Assistance from other people includes rescue, medical assistance and emergency services. project managers and field supervisors are to ensure that any person working in isolation or alone has multiple reliable means of communication e.g. radio and telephone supported by a rigorous 'check in' and emergency response procedure.

5.16 Soil erosion, sedimentation and dust control

Soil erosion, sedimentation and atmospheric dust can become hazardous to both humans and the natural environment. The soil potentially contains contaminants and care should be taken to reinstate land to a standard acceptable to landowners. Soil removed from holes should be prevented from contaminating the surface soil and reinstated into the excavation as quickly as possible.

5.17 Smoking

Smoking is prohibited on site.

5.18 Traffic management

A traffic management plan is not required for works on site, however all staff on site should be aware of traffic movements from driveways and moving along Coachman Lane. PPE requirements are noted in the JSEA.

5.19 Waste Management

Specific wastes generated by the project shall be managed according to legislative and client requirements.

Other than where required by legal or client requirement to develop a Waste Management Plan, the waste management techniques utilised on the project will be detailed within the activity JSEA.

5.20 Working in the heat (temperature extremes)

As work is being undertaken in the summer, there are likely to be high levels of sun exposure and temperatures are likely to exceed 25° C. Project managers are responsible to make sure staff are fully aware of the requirements for working in hot conditions.

Risk assessments will consider potential extremes of weather when they are being developed

Project managers and their staff, who are potentially exposed to hot environments, must receive appropriate training in the hazards associated with temperature extremes.

5.21 Damage to properties

Great care should be taken to prevent damage to the properties that make up the site. The state of the property should be documented before, during and after work is performed on the site, grass disturbance should be kept to a minimum, and movement of machinery over grass should be kept to a minimum. Further measures are outlined in the JSEA.

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6. External supplier management

GHD recognises the important role that effective HSE contract management plays in reducing injury and environmental damage on projects and GHD will implement effective systems to control risk associated with engagement of external suppliers.

6.1 InTouch external supplier registration

Successful GHD InTouch registration is required for all External Supplier organisations wishing to provide services to GHD i.e. directly engaged by GHD.

This registration is primarily the process that provides GHD with assurance that their individual service providers are able to deliver their services in a safe and environmentally responsible manner within a quality framework. The registration also confirms that adequate insurances are current.

InTouch Registration is facilitated via the *Subcontractor Registration* and recorded in *InTouch*.

6.2 Information transfer

External suppliers engaged to undertake activities on behalf of GHD are primarily responsible for the management of the hazards they face. However, GHD is responsible to notify its external suppliers of site specific requirements (e.g. client or GHD site rules) and also the hazards identified by GHD and the client / Site Controller that may affect their activities. Prior to commencing work on site, the project manager will:

- Provide external suppliers with the following information as minimum:
 - Client site rules (if any)
 - GHD site rules (see Section 4.4 of this Plan)
 - Any other specific hazard/risk information relevant to the site e.g. alert external suppliers to any environmental data required to meet environmental authority reporting requirements and communicate contents of relevant HSE Plan sections to third parties through the induction process
 - The project manager will monitor that the external supplier's people attend relevant pre-site work activities. Pre-site work activities for GHD controlled sites will comprise:
 - a. Site specific HSE Induction where required by the site controller or GHD (Principal Contractor) using *Project Briefing Sheet*
 - b. Pre-work assessments

Confirmation of receipt of HSE information transfer to external suppliers is to be recorded on the *JSEA*

6.3 Site specific external supplier HSE review

Prior to site work commencing, the project manager or delegate will undertake a review of External Supplier's HSE documentation specific to the project. Assistance may be sought from the HSE Manager / Coordinator to undertake these reviews.

The following HSE forms will be used to undertake reviews of External Supplier's site specific documentation:

- *Subcontractor / Sub consultant HSE Review (<\$250 AUD)*

- *Principal Contractor HSE Review*

The project manager or delegate will notify external suppliers of any deficiencies that require attention prior to commencement of work. While reviewing such documentation, it is understood that external suppliers may have specific discipline expertise (for which they have been contracted) which may be outside of GHD's band of knowledge. Therefore GHD are not agreeing/authorising the documents but reviewing them to the best of their knowledge using the resources available.

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7. Incident reporting and analysis

7.1 Incident reporting

All injuries, illnesses, property damage, environmental harm, near misses and safety observations will be verbally reported immediately to the project manager and/or field supervisor as soon as possible after the incident or in any case within 24 hours of the incident occurring. GHD must be notified within 48 hours of an incident occurring in accordance with the flowchart on the following page and must also comply with client reporting requirements.

All incidents involving GHD staff and Non-GHD staff on GHD Controlled/Supervised Sites will be reported by the completion of a GHD Incident Report within *IRIS Database*.

7.2 Incident investigation

The HSE Manager / Coordinator will determine the level of incident investigation as per *Business Management Procedure*, and assign the incident investigation to the appropriate person for action.

GHD utilise a Root Cause Analysis (RCA) process to determine the root cause(s) of incidents. RCA will be utilised for all incident investigations.

The RCA critical steps include:

- Select the investigation team
- Identify the primary event
- Develop the sequence of events
- Identify protective systems
- Determine direct or contributing causes(s)
- Work through the three levels of causation for each contributing factor
- Work through human/behavioural causes(s)
- Develop corrective actions/recommendations
- Validate appropriateness of corrective actions
- Write an investigation report
- Communication of investigation findings to relevant stakeholders

The incident investigation team will comprise members of the project team and the process may involve taking witness statements, photographs and data collection although this list is not exhaustive.

Where an incident is determined to be serious either by its outcome or its potential, the incident will be escalated and an investigation will be undertaken by the HSE Manager / Coordinator using the *Serious Incident Investigation*. A specific report detailing the findings of the investigation will be provided to the OC Management Team and Group Manager HSE.

Corrective actions identified as a result of an incident investigation will be recorded in IRIS and assigned to a responsible person to complete within an agreed timeframe.

Where an incident has occurred, the documents associated with the incident and its investigation (e.g. JSEA's, HSE Briefing Records etc) must be maintained on the Project File for a minimum of 7 years.

Where incidents involve Non-GHD staff on GHD controlled/supervised sites and GHD is not responsible for rectifying findings, the findings will be monitored via the [HSE Corrective Actions Register](#).

7.3 Lessons learned

Information gathered from incident investigations etc. will be analysed to identify lessons and monitor trends. The HSE Manager / Coordinator is responsible for this analysis and reporting of significant lessons or trends to OC management for the purpose of improving HSE, systems or practices.

Project managers will share the lessons or trends findings across the project team, with project stakeholders and others if required.

Refer to Figure 2 - GHD Incident Reporting Flowchart for more information.

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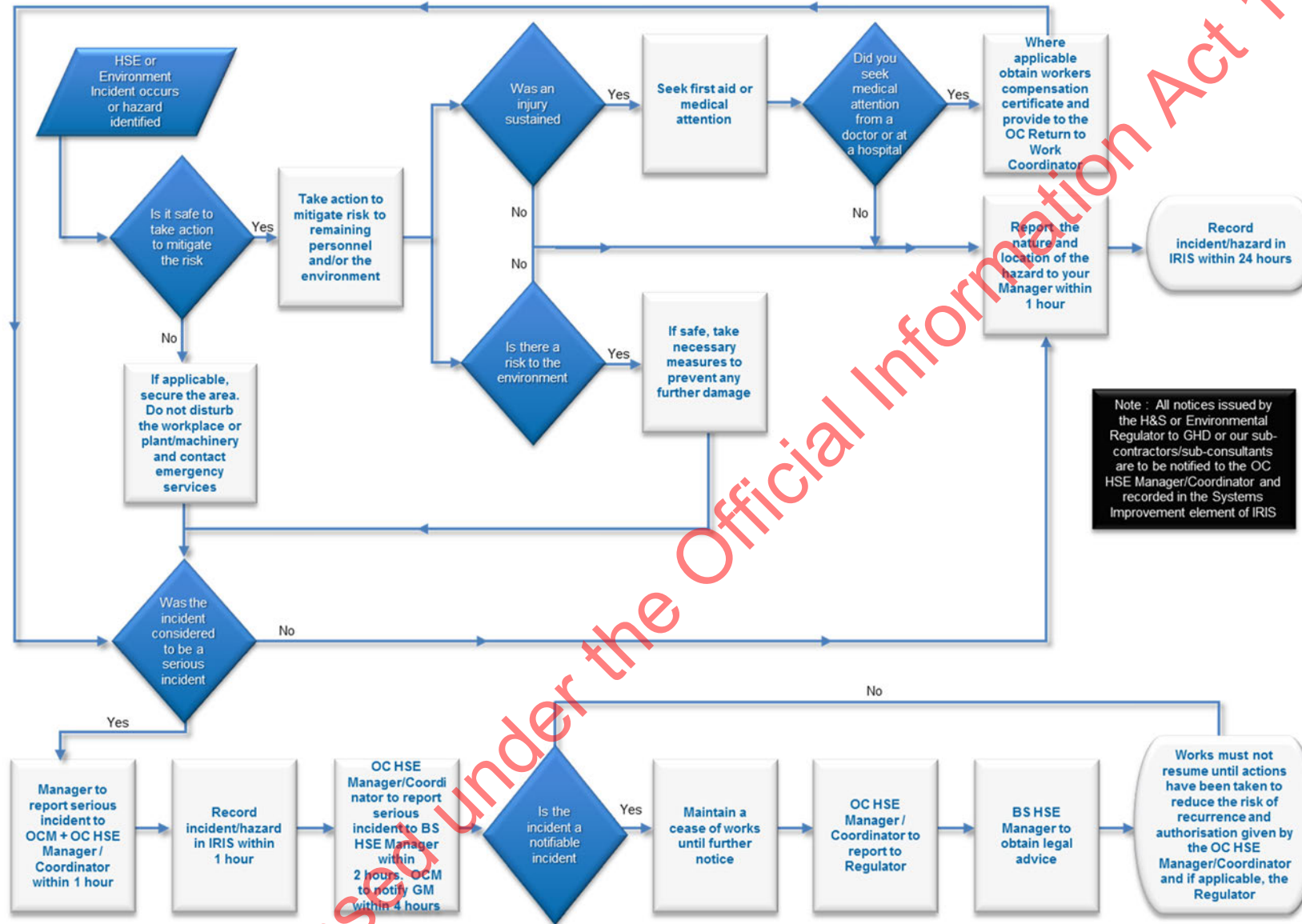


Figure 7-1 Incident reporting flowchart

8. Monitoring, auditing and improvement

This element aims to describe the project HSE inspection, auditing and monitoring review process that will be implemented to evaluate HSE performance on the project and to assess how effectively this Project HSE Plan is working.

8.1 GHD project HSE plan reviews

Project HSE Reviews will be undertaken by project directors to confirm compliance with GHD systems and outcomes entered into the *GHD HSE Database*. Project HSE Plan Reviews are to be completed prior to site work and at six monthly intervals thereafter or where there are significant changes to the project or statutory frameworks.

All improvements identified during the review process automatically populate the *IRIS Actions Register*.

To provide an independent assessment, OC management teams and HSE Manager / Coordinators are also to undertake regular Project HSE Plan Reviews.

8.2 HSE inspections

GHD will undertake regular scheduled *Checklist Site Inspection* of the site to measure compliance with the HSE requirements included in the contract agreement, jurisdictional legislation and specific Site HSE Rules. HSE inspections will include all project related activities (including external suppliers). Assistance may be sought from the HSE Manager / Coordinator to undertake HSE inspections.

The level of risk for an activity will determine inspection frequency. As a guide for projects with constant/ongoing site work, inspections will be undertaken weekly for activities including high-risk hazards, fortnightly for activities including medium risk hazards and monthly for activities including low risk hazards as determined by risk ratings within the JSEA. Client specific requirements may also dictate inspection frequency.

GHD approved HSE inspection checklists will be used to undertake these inspections and are available on *GHD's HSE Portal*. Upon completion of the inspection, the details and any identified issues that are within the control of GHD will be captured in the *GHD HSE Database*.

To review implementation of JSEAs, managers will also undertake inspections using *Management JSEA Site Review* and enter the results in the *GHD HSE Database*.

Monitoring of close out of those corrective actions identified against GHD controlled activities can be achieved via the database and the *IRIS Actions Register*.

Appendix A - JSEA

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HSE009 Job Safety and Environmental Analysis (JSEA)



Reference Documentation	11.01.02 HSE Job Management Procedure
Purpose of Form	JSEAs outline a safe and environmentally responsible method of work, identification of individual training needs, plant / machinery and equipment, inspection and legislative requirements for a specific activity taking into consideration the hazards and risks involved in completing the activity (during routine, non-routine and emergency working conditions).
Responsibility for Completion	Job Manager (or delegate) to complete in consultation with the GHD job team (includes identification and delivery of training).
Frequency of Completion and Review	JSEA to be developed prior to commencement of site work and reviewed at no more than 6 monthly intervals or where there are significant changes to the job scope, equipment, environment, personnel or statutory framework

Job Name & description:	s 9(2)(a) Landfill DSI - Drilling of 13 bores, Window sampling of 15 bores, 13 hand augers	Activity:	Site clearance/Drilling/Sampling
Job Number:	5137675	Activity Location:	s 9(2)(a)
		Activity Date:	18/12/17 - 22/12/17, 08/01/18 - 19/01/18

Task Step in Sequential Order	Hazards <small>What could cause injury or ill health, damage to property or damage to the environment (e.g. Water way, Refuelling)</small>	Event & Potential Outcome <small>What could go wrong (e.g. fall in water / diesel spill) and what might happen as a result (e.g. person drowns / soil contamination)</small>	Initial Risk Rating			Control Measures <small>(Hazards should be eliminated wherever possible or minimised where elimination is not reasonably practicable. Consider Hierarchy of Control - Elimination, Substitution, Isolation, Engineering Controls, Administrative Controls, Personal and Environmental Protective Equipment).</small>	Ref Guide <small>(e.g. Hazard Guides)</small>	Residual Risk Rating			Person (s) Responsible <small>(for implementing control measures)</small>
			Consequence	Likelihood	Risk Rating			Consequence	Likelihood	Risk Rating	

Note: Consequence should be assessed first so that the likelihood rating is the likelihood of the selected consequence occurring.

1	Asbestos	Staff could be exposed to asbestos fibres leading to a heightened risk of asbestos related illnesses	D	5	Extreme	<p>There is thought to be a low risk of encountering asbestos on site - if encountered, stop work and assess and contact Project Manager. Only recommence work when appropriate PPE is in place.</p> <p>All ACM products being relocated or removed from site must be securely sealed in heavy duty plastic, clearly identifiable and disposed of at Chem Waste. Decontamination of the workplace, tools and other equipment will be completed via wet wiping and using the DECON 90 washdown procedure.</p> <p>The following PPE will be worn: disposable overalls, with a hood; disposable gloves; footwear that can be washed; respiratory protection - P2 Respirator filter minimum.</p> <p>Personal decontamination will be undertaken prior to removing a respirator - wet wipe as much of as possible of PPE, exposed skin; remove gloves, overalls and lastly respirator. Place all contaminated rags and PPE in disposable plastic bag as it is removed, seal the bag and clearly mark 'Contaminated' prior to disposal. Thoroughly wash hands - including under finger nails, face and other exposed skin before eating and at the completion of the work.</p> <p>NEVER eat whilst in PPE. Specific items of PPE are listed on last page of JSEA.</p>	HSEG201	D	1	Moderate	HG, DJ, PJ
2	Manual handling	Injury to back and/or other parts of the body	C	4	Moderate	<p>Staff undertaking activities involving manual handling have undertaken the GHD e-learning package - Manual Handling.</p> <p>Job Team to use appropriate storage areas and plan for heavy and awkward shaped items to be stored at locations that are easy to reach and are located between knee and shoulder height.</p> <p>Team handling should only be used in as a temporary interim control. When completing team lifting, consideration will be given to the individual's physical capabilities and heights.</p> <p>Where object to be carried or moved exceeds 16 kgs in weight or the item is awkward to handle, team lifting or mechanical equipment - forklift truck; barrow; etc. will be used to assist.</p>	HSEG214	C	2	Low	DJ, PJ

3	19-D-02771 Tools - Hand Operated	Injuries to eyes / limbs from cutting edges Muscular injuries and/or strains Electrocution / electrical burns Burns from hot equipment / parts Excessive energy consumption	C	3	Moderate	<p>Staff using hand operated tools have undertaken the GHD e-learning package - Tools - Hand Operated.</p> <p>Tools will not be fashioned or used for activities other than those designed to do so.</p> <p>Tools will be inspected on a regular basis, so that conditions which may lead to failure can be identified. Only competent and authorised persons will undertake repairs or maintenance on hand tools (including power tools).</p> <p>Power tools will be stored in accordance with manufacturers instructions and tested in accordance with relevant standards - Refer to Electrical Hazard Control measures.</p> <p>Power tools will not be used in the rain or while standing on wet ground.</p> <p>Residual current devices will exist on circuits where GHD equipment is connected.</p> <p>The exact type of PPE to be used with hand operated tools will be identified via manufacturer's instructions and are listed on last page of the JSEA.</p>	HSEG223 / HSEG205	C	1	Low	DJ, PJ
4	Waste management / contamination	Incorrect / illegal disposal of waste materials Injury / illness resulting from contact with hazardous waste materials Contamination of land / water resulting from incorrect handling / disposal of waste materials Excessive waste generation Non-compliance with GHD policy and local laws/regulation	C	4	Moderate	<p>All waste generated by GHD activities will be collected and removed from site or deposited into client provided receptacles</p> <p>Soil disturbed by drilling will be returned to the borehole</p>	N/A	C	1	Low	DJ, PJ
5	Slips and trips	Injuries to persons resulting from falling at the same level	C	3	Moderate	<p>Staff exposed to slip and trip hazards have undertaken the GHD e-learning package - Slips and Trips.</p> <p>High risk slip and trip areas will be identified and access limited.</p> <p>Staff will wear ankle high lace up safety footwear with soles appropriate to the hazards presented (e.g. gravel or oily surfaces).</p> <p>Staff will practice sound housekeeping practices - e.g. cleaning up spillage immediately; implementing waste management practices to prevent rubbish build up; keeping walkways clear of trailing cables or other obstructions and obstacles; and providing adequate and appropriate storage facilities to minimise risk of slips and trips.</p>	HSEG221	C	2	Low	DJ, PJ

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6	19-D-02771 Soil erosion, sedimentation and dust control	Release of soil and sediments to waterways - non-compliance with Erosion and Sediment Control Plans (potential fines) Injuries to persons due to slips/trips/falls Damage to resident's properties, Potential contamination of surface soils	D	4	Significant	Care will be taken to ensure that grass removed for sampling is replaced in a tidy and clean fashion Soil excavated during sampling will be placed on impervious sheeting to ensure soil does not contaminate surface soil Disturbed areas will be restored to pre-existing condition (or as near as practicable) as soon as possible, allowing for limited ground settlement. Excess material will be managed in accordance with jurisdictional and/or client requirements.	HSEG222	C	1	Low	DJ, PJ
7	Traffic - Working Around	Injury / death due to contact with motor vehicle(s) Damage to property due to impact from motor vehicle(s)	E	4	Extreme	Staff undertaking activities in proximity to live traffic (including on designated footpaths) will undertake the GHD e-learning package - Traffic-Working Around. GHD staff and persons under GHD control will maintain safe working distance from live traffic as described in HSEG224. All staff in the vicinity of live traffic (including undertaking work activities on designated footpaths) will wear jurisdictional and GHD approved (and client where necessary) high visibility clothing including high visibility vest or jacket, safety footwear and other PPE as appropriate. Retroreflective striping will be on all night time PPE outer garments (e.g. vests, jackets, wet weather gear etc.)	HSEG224	E	1	Moderate	HG, DJ, PJ
8	Outdoor exposure	Exposure to UV Sunburn - heightened risk of melanoma Dehydration Hypothermia Hyperthermia Heat Stress Organ failure Death	D	3	Significant	Personnel undertaking activities outdoors will wear a broad brimmed hat, long sleeved shirts with a collar; long legged trousers and 30+ sunscreen protection on exposed areas. Drinking water will be carried by the job team to minimise risk of de-hydration. Programmed rest breaks, rostering, etc. and additional PPE will be implemented where personnel are required to work in extreme temperatures to reduce risk of fatigue, hyperthermia, heat stroke etc. Individuals exposed to extreme temperatures will be monitored for adverse effects - heat stress/stroke; excessive fatigue	HSEG230	D	2	Moderate	HG, DJ, PJ
9	Fire	Death / injury due to fire	E	4	Extreme	Emergency response planning will be documented, practiced and reviewed on a regular basis. Fuel sources (e.g. long grass, flammable liquids etc.) will be identified and reduced prior to work where GHD activities introduce ignition sources. All GHD site vehicles will be diesel fuelled to minimise risk of ignition and carry a fire extinguisher at all times. All GHD activities that introduce ignition sources (e.g. hot works) will be accompanied by a fire extinguisher. Drillers will require fire extinguishers - communicate this to contractors to ensure they have them	N/A	E	1	Moderate	HG, DJ, PJ

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10	19-D-02771 Fatigue	Loss of concentration / decreased productivity / impaired judgement Illness (if prolonged exposure to stressors) Injury to self or others due to loss of concentration / coordination	C	5	Significant	Rostered hours of work will be simple and predictable. Where shifts are required they will rotate from day, to afternoon, to nights and then back to days. Longer blocks of shift allow better physiological adaptation. On extended shifts (in excess of 10 hours) rotations every two or three days are preferred. Commuting and travelling time will be considered part of the total hours worked in a day. Work arrangements will allow sufficient time off each 24 hours to allow at least 7-8 hours consecutive sleep. Arrangements will be made to prevent staff, working more than 16 hours in a 24-hour period, working above 14 hours per day for more than 5 days, working more than an average of 60 hours per week over a four-week period. Project director and OC HSE Manager/Coordinator approval (based on risk assessment) required to work outside these arrangements.	HSEG207	C	2	Low	DJ, PJ
11	Mobile Plant / Machinery - Working around	Injury or death to persons and / damage to vehicles and / or equipment	D	3	Significant	Staff undertaking activities in the proximity to mobile plant/machinery will undertake the GHD e-learning package - Working Around Mobile Plant. As a general rule, staff will not work within 3 metres / 10 feet of moving plant or within the 'swing area' of revolving plant/machinery. When approaching mobile plant/machinery staff will make eye contact with the operator and signal for the operator to stop work before moving into this area. Defined physical barriers and exclusion zones will be implemented to delineate plant/machinery movement areas and prevent access of wider site personnel or members of the public (e.g. pedestrians or traffic). Where physical barriers and exclusions are not implemented, and persons (site personnel or public) remain in close proximity of moving plant/machinery a spotter will be assigned to that item of plant/machinery. Communication systems will be established between spotters, workers on foot and plant/machinery operators. A Pedestrian and Vehicle Movement Plan will be developed in accordance with jurisdictional and client requirements to facilitate personnel movement around moving plant/machinery.	HSEG215	D	2	Moderate	HG, DJ, PJ
12	Excavations	Death or Injury to staff and other people Damage to underground services - release of gas, sewage, water under pressure, electrical Clearing of vegetation without a permit / authorisation Erosion and soil run off to waterways Injury to wildlife	D	4	Significant	Excavations will be barricaded and secured to minimise risk to people or equipment/machinery- including members of the public and road traffic. Hard hat to be worn in and around excavations when there is the risk of being struck on the head (e.g. by falling objects or by equipment/plant/machinery).	HSEG206	D	1	Moderate	HG, DJ, PJ

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13	19-D-02771 Utilities - Overhead	Electrocution / electrical burns Damage to property and equipment	E	4	Extreme	<p>Staff undertaking activities that may come into contact with overhead utilities will undertake the GHD e-learning package - Overhead Utilities.</p> <p>Work will not be undertaken inside that of the safe working distances described in HSEG225 without accredited provider assistance.</p> <p>Overhead utilities will be de-energised prior to activities commencing that may encroach on the identified safe working distances described in HSEG225.</p> <p>Plant/machinery (e.g. drill rig, digging equipment) utilised on site will be of a suitable size so as not to come into contact with overhead utilities.</p> <p>Overhead utilities will be identified and height from ground assessed prior to work commencing.</p> <p>Emergency response processes will be identified and documented by to work commencing activities to enable safe recovery in the event of striking an overhead utility</p>	HSEG225	E	1	Moderate	HG, DJ, PJ
14	Utilities - Underground	Injury from contact with electrical services Injury / illness from gas explosion / escape of gases Injury from release of water (under pressure) Erosion of soil Impacts on flora and fauna Soil run off and sedimentation of local waterways Illness resulting from exposure to sewage Release of sewage to waterways Damage to property and equipment	E	4	Extreme	<p>Staff undertaking activities that may come into contact with underground utilities (e.g. ground penetration) will undertake the GHD e-learning package - Underground Utilities.</p> <p>Site utility plans and data will be thoroughly reviewed to identify potential underground and checked by a suitable team member prior to starting work.</p> <p>Sampling locations will be marked with spray paint or a stake in the ground</p> <p>Actual location of underground utilities will be identified using electronic detection devices by trained persons, and marked on site plans.</p> <p>No intrusive work will be undertaken without the approval of the Project Manager or Project Director</p> <p>Any underground markers disturbed during earth disturbance activities (e.g. identification tape) will be reinstated to pre-existing condition.</p>	HSEG226	E	1	Moderate	MB, HG, DJ, PJ

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15	19-D-02771 Noise and vibration	Health affects from prolonged exposure to noise may include temporary threshold shift / permanent hearing loss Health affects from prolonged exposure to vibration may include blood pressure and heart problems and nervous disorders and / or hand / arm operation conditions	C	3	Moderate	<p>Staff exposed to work generated noise will undertake the GHD e-learning package - Noise.</p> <p>If the noise in an area is suspected to be above 85 dB (a) and cannot be reduced by other means (e.g. isolating staff from the noise source), staff will wear PPE (e.g. earplug, earmuff) of a suitable attenuation to reduce the level of noise reaching the persons ears.</p> <p>Administrative controls e.g. job rota ion, job re-design or rosters may be necessary to assist engineering controls reduce noise to an acceptable level. Where administrative controls are relied on they are to be regularly reviewed to satisfy compliance.</p> <p>PPE will be maintained in accordance with manufacturer's standards to maintain quality of noise reduction.</p>	HSEG216	C	1	Low	DJ, PJ
16	Flora and fauna	Injury to person from vegetation e.g. sap in eye, scratches / wounds from branches Damage to vegetation / habitats Unauthorised clearing of vegetation (resulting in fines) Damage to vehicles/equipment/people due to impacts from vegetation Inflammation / infection / irritation / illness resulting from a bite or sting Injury / death to fauna resulting from vehicle and / or human impacts	C	4	Moderate	<p>Bees and Dogs have been identified on site. Before work is undertaken there should be checks to see if team members have allergies. If there are any, ensure team members are carrying any allergy medication required or taking any other steps required</p> <p>Keep distance away from beehives and animals</p> <p>Ensure dogs are controlled before entering property.</p> <p>The amount of vegetation cleared will be kept to the minimum required to safely and effectively access areas and complete tasks.</p> <p>Personal Protective Equipment (PPE) (e.g. eye protection, long sleeved shirt and trousers, gloves) will be implemented to protect eyes, hands and other body parts from animal bites / stings</p>	HSEG210	C	1	Low	DJ, PJ

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17	19-D-02771	Vehicles/ driving	Injury / death resulting from motor vehicle accident Damage to vehicles / property resulting from motor vehicle accident Injury / death to wildlife Damage to vegetation / habitat	D	3	Significant	<p>Vehicles selected for activities on the job will be fit for purpose (e.g. 4WD) and staff operating these will be licensed in accordance with jurisdictional requirements.</p> <p>Vehicles will be driven in accordance with jurisdictional laws and client requirements (e.g. speeds).</p> <p>Only persons trained 4WD operation and recovery will drive 4WD vehicles off demarcated roads (e.g. bitumen or gravel).</p> <p>Travel to and from site will be counted as part of total work hours for the purposes of managing fatigue management.</p> <p>Vehicles will be inspected by the driver prior to use to identify if there are any issues that may affect the performance or safety of the vehicle.</p> <p>Use of mobile phones in vehicles will be in accordance with jurisdiction and/or client requirements and as a minimum only used when blue tooth or hands-free mode is in use.</p>	HSEG227 / HSEG208	D	1	Moderate	HG, DJ, PJ
18		Exposure to contaminated soil and groundwater	Skin irritation, nausea, headaches, exposure leading to long term health problems, discharges of contamination into environment	D	4	Significant	<p>Use of appropriate PPE - disposable gloves, eye protection, safety boots, HSE long sleeved clothing.</p> <p>Measures will be taken to prevent the discharge of contaminants into the environment - soil removed from bores will be placed on an appropriate surface and excess spoil backfilled into hole with turf replaced on top.</p>	N/A	D	1	Moderate	HG, DJ, PJ
19		Vapour from contaminated soil	Skin irritation, nausea, headaches, exposure leading to long term health problems	D	4	Significant	<p>VOCs will be monitored using a PID and LEL detector.</p> <p>Air monitoring will meet the following standards</p> <ul style="list-style-type: none"> • Methane – 5% LEL, 1,000 PPM 8hr TWA • Carbon Monoxide – 25ppm limit – NZ WES • H2S – 10ppm limit – NZ WES • Oxygen – Safe Levels are between 19.5-23.5% - NZ WES • Benzene – 1 ppm TWA, 2.5 ppm STEL - NZ WES <p>If the standard is exceeded, field lead will contact PM and workers will retreat to a safe distance until the levels in the area drop back below the standard. If the levels stay at an elevated level for an extended period of time the Project Manager should be contacted to discuss way forward.</p>	Workplace Exposure standards	D	1	Moderate	HG, DJ, PJ
20		Damage to property	Dissatisfied landowners, Liability for damage	C	5	Significant	<p>Ensure the utmost care is taken when working on properties</p> <p>Photos of property and path taken to sampling site before, during and after works</p> <p>Cutting out square of grass before intrusive works and replacing when work completed</p> <p>Collection of all soil removed from excavations on tarpaulin and reinstatement after work completed</p> <p>Avoiding tracking mini-drill rig over grassed surface and mitigating when unavoidable - i.e. use of boards</p> <p>Cleaning up any materials used before leaving property</p>	N/A	C	1	Low	DJ, PJ

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List inspection and maintenance required for this activity: 19-D-02771		List the relevant sections of Legislation, Codes of Practice or Standards applying to this activity:		Provide details of statutory and non-statutory certificates/ permits/approvals required for this activity & location if required:		
- Inspect vehicle prior to departure - Check weather prior to departure - Update whereabouts, advise SGM/Office Admin of travel		Overarching Health and Safety at Work Act 2015 Health and Safety at Work Regulations 2016 Legislation Resource Management Act 1991		- - - Use of Underground Service Identification Devices -		
- HSE033 - Vehicle Inspection -				Construction Industry Induction in your jurisdiction		
Emergency Arrangements:		List plant/machinery and personal and/or environment protective equipment required:		List certifications and training (includes Service Line Procedures and GHD e-learning) required to complete activity (PM to confirm with job team):		
Role	Name & Contact Number		- Hi Vis Vest - - Hard hat - - Ankle High Steel Capped Boots - - Long Sleeves and Trousers - - Disposable Overalls with Hood - Gloves - - Respirator - - Dust Mask - - Hearing Protection - Comms - Mobile Phone / Satellite Phone - - Sunscreen and Hat - - Safety Glasses - - First Aid Kit - - - - Wet wipes - - Water bottle - - Fire Extinguisher - - Excavations - GHD e-learning - Hand Operated Tools - GHD e-learning - Hazardous Substances and Dangerous Goods - GHD e-learning - Manual Handling - GHD e-learning - Overhead Utilities - GHD e-learning - Slip and Trip - GHD e-learning - Underground Utilities - GHD e-learning - Working around Mobile Plant - GHD e-learning - Working Around Traffic - GHD e-learning - Drivers Licence -			
Job Manager	Hannah Galloway 03 378 0918					
Client Contact	Conor Parker 027 839 0101					
HSE Manager / Coordinator	Nigel Craig 64273708131					
Emergency Services	111					
Nearest Hospital	Christchurch Hospital					
Information to provide in case of an emergency						
Assembly Point	s 9(2)(a)					
Nearest Rd / St and distance	s 9(2)(a)					
Local landmarks	s 9(2)(a)					
Created by PM Name (or suitably delegate)	Signature	Date	Reviewed & Approved by PD Name (or suitably skilled and experienced delegate)	Signature	Date	PD Review in HSE Database? (JSEA, P2, P3, P4)
David Jackson		8/12/2017	M.Ballard	<i>M Ballard</i>	12/12/2017	Yes / No
By signing, I understand and agree to work to this JSEA, referenced procedures and have completed listed training. I am empowered to stop work if any person's safety or the environment are at risk.						
GHD Job Team Name	Position	Qualification	Signature	Date		

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Reference Documentation	11 01 02 HSE Job Management Procedure
Purpose of Form	Daily methodology used to facilitate communication and consultation of HSE information, confirm all hazards have been identified on the JSEA, identify new hazards or altered conditions that may affect the delivery of the JSEA and check HSE training requirements
Responsibility for Completion	Job Manager (or delegate) to facilitate and include all members of the job team including GHD engaged subcontractors / subconsultants and visitors
Frequency of Completion and Review	To be performed daily on arrival to site but prior to the commencement of work and at any other time during the day where circumstances change (e.g. following an incident, changes to weather conditions, implementation of Stop Work Authority) an additional assessments will be carried out to identify possible new hazards and agreed control measures.

Job Name & description:	s 9(2)(a) Landfill DSI - Drilling of 13 bores, Window sampling of 15 bores, 13 hand augers	Activity:	Site clearance/Drilling/Sampling
Job No:	5137675	Activity Location:	s 9(2)(a)

Date and Time	Specific Site Location	Hazard(s) <small>Not addressed in JSEA. Indicate if no new hazards are identified</small>	Consequence	Likelihood	Risk Rating	Control Measures <small>(Hazards should be eliminated wherever possible or minimised where elimination is not reasonably practicable. Consider Hierarchy of Control - Elimination, Substitution, Isolation, Engineering Controls, Administrative Controls, Personal and Environmental Protective Equipment).</small>	Consequence	Likelihood	Risk Rating	Sign-off <small>(Includes all GHD Team Members, subcontractors, visitors)</small>
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Notes: Print a sufficient number of Pre-Work Assessments sheets for the number of days on site. Allow more space for large job teams if applicable, or use the Single-Day Pre-Work Assessment Template
 Upon arrival at site, the Job JSEA should be reviewed and hazards that are no longer relevant crossed out. Site specific hazards identified are to be assessed below.

I understand the site-specific hazards and control measures identified and the emergency response arrangements for the site. I have completed required training and am empowered to stop work if any person's safety or the environment are at risk. If at any stage during the day circumstances change or a Stop Work Authority is implemented, an additional assessment will be carried out to identify possible new hazards and agreed control measures.

Consequence Descriptors					
	A - Insignificant	B - Minor	C - Moderate	D - Major	E - Catastrophic
Health and Safety	Incident requiring no first aid	Incident requiring first aid only and no medical treatment Reversible health effects of little concern, requiring first aid treatment at most Minor irritations of eyes, throat, nose and/or skin, or minor unaccustomed muscular discomfort	A medical treatment or minor lost time injury E.g. Sprains and strains and minor fracture (including fingers, thumbs and toes) Reversible health effects of concern that would typically result in medical treatment	A significant lost time injury E.g. Significant fracture (other than digits), amputations, dislocations; loss of sight, electric shock or injuries requiring admittance to hospital Severe, reversible health effects of concern that would typically result in a lost time incident	Fatality(s) or permanent disability Irreversible health effects or disabling illness
Environment	Negligible on-site / off-site environmental impact and of low significance	On-site / off-site environmental localised impact, immediately contained	On-site / off-site environmental short term impact, immediately recoverable	On-site / off-site environmental medium term impact or repeated non-compliance with potential in some jurisdictions for prosecution	Significant on-site / off-site environmental long term harm that is not recoverable. Significant fines and prosecution at company and individual level may apply in some jurisdictions

GHD Likelihood Descriptors

Likelihood Descriptor	Guidance	Exposure
5 - Almost Certain	Expected to occur in most circumstances	Frequent (daily) exposure at > 10x Occupational Exposure Limit (OEL)
4 - Likely	Will probably occur in most circumstances	Frequent (daily) exposure at > OEL
3 - Possible	Is conceivable that it may occur	Frequent (daily) exposure at > 50% of OEL. Infrequent exposure at > OEL
2 - Unlikely	It is improbable that it may occur	Frequent (daily) exposure at > 10% of OEL. Infrequent exposure at > 50% of OEL
1 - Very Unlikely	Highly doubtful but could occur in exceptional circumstances	Frequent (daily) exposure at < 10% of OEL. Infrequent exposure at > 10% of OEL

Likelihood	Consequence				
	A - Insignificant	B - Minor	C - Moderate	D - Major	E - Catastrophic
5 - Almost Certain	Low	Moderate	Significant	Extreme	Extreme
4 - Likely	Low	Low	Moderate	Significant	Extreme
3 - Possible	Negligible	Low	Moderate	Significant	Extreme
2 - Unlikely	Negligible	Negligible	Low	Moderate	Significant
1 - Very Unlikely	Negligible	Negligible	Low	Moderate	Moderate

Potential HSE Hazards	
Asbestos (HSEG201)	Mobile Plant / Machinery (HSEG215)
Biological Hazards (HSEG202)	Noise and vibration (HSEG216)
Chemicals/Radiation (HSEG203)	Rail corridor (HSEG219)
Confined Spaces (HSEG204)	Remote/ isolated / lone working (HSEG220)
Excavations (HSEG206)	Slips and trips (HSEG221)
Extreme Temperatures (HSEG230)	Soil erosion, sedimentation & dust control (HSEG222)
Fatigue (HSEG207)	Tools - Hand Operated (HSEG223)
4WD Vehicles (HSEG208)	Traffic (HSEG224)
Fixed plant / machinery (HSEG209)	Utilities - Overhead (HSEG225)
Flora and fauna (HSEG210)	Utilities - Underground (HSEG226)
Heights (HSEG211)	Vehicles/ driving (HSEG227)
Heritage and cultural significance (HSEG212)	Waste management/ contamination
Manual Handling (HSEG214)	Water (HSEG229)

GHD ALARP Reporting Framework

ALARP Actions				
Residual Risk Category	Negligible/Low Residual Risk	Moderate Residual Risk	Significant Residual Risk	Extreme Residual Risk
Actions	Continue task or activity within existing systems, processes and controls	Continue task or activity considering all practicable controls to reduce risk Active monitoring of the risk is required	Adopt and implement all practicable risk reduction measures to reduce risk Active management of the risk is required	Do not accept the Job / Do not commence work / Stop task or activity and notify management immediately Do not proceed until level of risk has been reduced
Source of Risk	ALARP Management Responsibility			
Job Specific	Listed on relevant risk assessment and JSEA	Project Director	Project Director If risk reduction not achieved - Service Group Manager	Operating Centre Manager If risk reduction not achieved - Practice Management Group Representative

GHD

Level 3, 138 Victoria Street
 T: 64 3 378 0900 E: chcmail@ghd.com

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	D Jackson	M Ballard	<i>M Ballard</i>	M Ballard	<i>M Ballard</i>	12/12/17

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