Babbage

Town Belt East Road Exchange

Preliminary Site Investigation

for: Westland Milk Products

Job No: 63766

Version: Issued

eTrack No: 200040739

Date of Issue: 15/02/2022

DOCUMENT APPROVAL AND REVISION HISTORY

Document title	Town Belt East Road Exchange
	Preliminary Site Investigation
Prepared for	Westland Milk Products
Version	Issued
Date	15 February 2022
Filename	PSI Westland Transport Hub for consent 20220215.docx
eTrack number	200040739

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Reviewer	
	Dr Grant Allen
	Environmental Manager

Rev. No	Date	Version	eTrack No.	Author	Reviewer
1	15/02/2022	Issued	200040739	MC	GA
2					

Reference: Babbage 2022. Town Belt East Road Exchange Preliminary Site Investigation. A report prepared for Westland Milk Products by Babbage Consultants Limited. February 2022.

Cover photo: Aerial photo provided by Westland Milk Products

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1 INTRODUCTION

1.1 Background

Babbage Consultants Limited (Babbage) was engaged by Westland Milk Products (WMP) to carry out a preliminary site investigation (PSI) of the properties it owns in and around 8 Kaniere Road, Hokitika. These properties will become part of WMP's Town Belt East Road Exchange project (the "project area"). A PSI is required to determine the contamination status of the project area, which will be disturbed during the proposed development works. This report has been prepared in accordance with Ministry for the Environment's Contaminated Land Management Guideline No. 1 (MfE, 2011a).

1.2 Site Identification

The properties that make up the project area are listed below in Table 1.

Table 1. Site Details for project area

	Detail
Address and Legal description	8 Kaniere Road, Hokitika (LOT 4 DP 1051 BLK I KANIERE SD), 12 Kaniere Road, Hokitika (LOT 2 DP 2695) and part of 19 Town Belt East, Hokitika (LOT 3 DP 2695). A small section (approximately 430 m^2) of a road in the southernmost part of the project area is also included (no legal description is available).
Site area	Approximately 9,920 m^2 in total
Site zoning	All are zoned "Small Settlement Zone (residential) except the roadway to the south which is zoned rural.

1.3 Scope of Work

The scope of this PSI includes:

- A review of current and historical aerial photographs to identify land uses.
- A review of property files, reports and other documentation provided by the client.
- An interview with a site worker
- Preparation of a report summarising the findings of the investigation and potential regulatory implications.

No site visit, soil sampling or analysis was undertaken in the process of preparing this report.

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CLIENT / PROJECT

Westland Milk Products

Figure 1 - Site Layout

MAP TITLE

Town Belt East Road Exchange- Preliminary Site Investigation

MAP REVISIONS

21/09/2020	Initial version by TT.

Legend

- Property Names
- Extent of PSI
- Proposed New Road

SOURCES

Road and Legal Data: LINZ Data Services
Aerial Photography: LINZ Online Database
NZ Primary Parcels: LINZ Data Services

DISCLAIMER:
This map/plan is not an engineering draft.
This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SCALE

1:1,000 @ A3

MAP NO.

63766 BEE01 01

2 SITE DESCRIPTION

2.1 Site Layout

The project area adjoins Kaniere Road to the north, Town Belt East Road to the east, the former Hokitika Kaniere tramway (now a road) to the south and commercial properties to the west. The project area is generally flat in the northern areas from the residential property at 8 Kaniere Road to the middle of 19 Town Belt East Road, the southern border dips into a culvert along the southern border.

Covid-19 travel restrictions meant a site inspection was not possible by Babbage staff. However, a project area walkover carried out by WMP staff was carried out on 30 November 2021. The following description is based on photos provided to Babbage, some of which are shown on Figure 2 and Figure 3.

a)

b)

Figure 2. a) Centre of the project area, view south and b) centre of the project area, view west

a)

b)

Figure 3. a) Equipment storage and b) contractor storage

2.2 Current Site Uses

The current use (at the time of the WPM inspection) of the project area is described, by property, below:

- 8 Kaniere Road - Residential with a single dwelling and outbuildings. Vegetation consists of pasture, shrubs and gardens.
- 12 Kaniere Road - Used as a laydown area for WMP contractor equipment. Predominantly covered in compacted hardfill. The western, northern and eastern edges of the property include some pasture and weed plants.
- 19 Town Belt East (including small section of former Hokitika Kaniere tramway/road) - Used for the storage of parts for the WMP factory, contractors' equipment in containers and in a steel contractors shed. Predominantly covered in compacted hardfill, the southern edge and eastern corner edges is vegetated in shrubs and weed plants.

Details are provided in Figure 4.

2.3 Surrounding Land Use

The surrounding land uses at the time of the inspection are as follows:

- North – Properties directly to the north are residential.
- East – Properties to the east include an electrical sub station (10 Kaniere Road) and a hardware store/timber merchant (McMullan Timber ITM) at (18 Kaniere Road).
- South – The former Hokitika Kaniere tramway (now a Gravell Road) borders the project area to the south, this includes two historical buildings related to the tramway activities.
- West – A BP truck stop directly adjoins the site to the west, beyond which is Town Belt East Road and the WMP milk factory.

2.4 Environmental Setting

2.4.1 Geology

The GNS 1:250,000 Geology of the Greymouth Area (2002) map indicates that the underlying geology of the site consists of postglacial deposits, including river gravel and sand, fan deposits and swamp deposits (identified as Q1a/Q2a). A recent geotechnical borehole investigation by Beca Consultants in the neighbouring WMP factory area, logged on the New Zealand Geological Database (NZGD, 2021b) noted light brownish grey gravels and sand at 1.5 m below ground level (mbgl) overlying hard silt at 8 mbgl which became more sand like at 11.8 mbgl.

Figure 4 Site Layout

2.4.2 Hydrogeology

The Beca borehole investigation logged on the New Zealand Geological Database (NZGD, 2021b) also noted groundwater at 1.5 mbgl. Considering the proximity to the Hokiatika River and the underlying geology, groundwater in the project area would be expected to be relatively shallow and would be expected to flow toward the Hokitika River.

2.4.3 Hydrology

Surface water in the residential property at 8 Kaniere Road is expected to discharge into the local storm water system and then the Hokitika River. Surface water from the remainder of the project area would also be expected to flow mostly into the depression in the into a culvert along the southern border and then west into the Hokitika River. Neighbouring properties also contain culverts which likely drain to the Hokitika River.

3 HISTORICAL SITE USE

3.1 Aerial Photography

A project area timeline (below) was derived by reviewing aerial photographs from Google Earth Pro (Google, 2021a) and Retrolens (LGGA, 2021c). Selected images are included in Appendix A.

1943 – The project area is predominantly pasture with three small buildings visible, two in the northern centre of 19 Town Belt East and one on the western corner of the "Road" section of the project area. The two small buildings in 19 Town Belt East may be related to grazing activities while the other building appears to be part of the neighbouring sawmill and tramway to the south. The sawmill occupies most of the property to the east while more pastureland lies to the west and what appears to be scrubland to the north.

1951 – Little has changed since 1943 except for three additional residential buildings constructed to the north of the project area.

1963 – The residential house has been constructed on the property at 8 Kaniere Road as well as the neighbouring properties at 6 Kaniere Road and 12 Kaniere Road. Storage of wood from the sawmill is now visible on the southern edge of the "Road" section of the property. There also what appears to be a sawdust pile on the eastern edge of 19 Town Belt East originating from the sawmill.

1970 – Wood storage has been removed back into the sawmill property.

1988 – The small buildings on 19 Town Belt East have now been removed however little else has changed on the site. Commercial/industrial activities have begun on the western side of Town Belt East.

2006 - 2013 – The project area is still in pasture/residential. Commercial/industrial activities on the western side of Town Belt East have intensified with dairy factory buildings adjoining Town Belt East Road. The BP Truckstop is also visible in the 2013 aerial photo, adjacent to the western project area boundary.

2015 – 12 Kaniere Road and most of 19 Town Belt East have been covered in hardfill and are now being used to store what appear to be boxes and other material.

2018 – The majority of the project area continues to be used for storage including shipping containers and boxes. The eastern side of 19 Town Belt East is covered in a vegetated mound.

2021 – A shed has been constructed to the east of the centre of 19 Town Belt East.

3.2 Council Records

Council held files provided for review included the contaminated sites register (called Selected Land Use Sites register) and property file.

3.2.1 Selected land use sites register

A query was made to the West Coast Regional Council (WCRC) for any information on the project area held on the contaminated sites register, referred to as Selected Land Use Sites register (SLUS). The response is provided in Appendix B and shows no known hazardous land use has occurred in the project area. The neighbouring truck stop, electrical substation and hardware store are included on the register, and indicate potentially contaminating activities have occurred on these neighbouring sites.

3.2.2 Property File

A review of the relevant Westland District Council (WDC) property files did not refer to any potentially contaminating activities within the project area. The property file for 19 Town Belt East included some information about the BP truckstop (which includes a 50,000 L double skinned above ground diesel fuel tank) but the truckstop is outside the project area.

3.3 Previous Reports relating to the site

The site has been the subject of one environmental report which was provided by WMP for review. The report is provided as a memorandum entitled Butter Factory – Baseline report dated 23 August 2021 by Christopher Bergen at WSP Consultants (provided in Appendix C).

The report relates the analytical results of soil at the location of a containment cell prepared to store and encapsulate fill which had been excavated as part of the construction of a new butter factory. The purpose of the sampling was to characterise contaminant levels in the soils excavated during the construction of the factory. The containment cell is in the vegetated area to the eastern side of 19 Town Belt East.

Sampling involved the excavation of six shallow test pits and the analysis of 10 samples for arsenic, cadmium, copper, lead, nickel, and zinc and six samples for hydrocarbons. All samples contained trace elements and hydrocarbons below human health and landfill disposal guidelines. Hydrocarbons were however detected above background concentrations in all six samples, and lead was above background concentrations in one sample.

The fill present in this containment cell would therefore not be considered cleanfill as defined in the MfE document A Guideline to the Management of Cleanfills (MfE, 2002).

3.4 Interview with site worker

An interview with a WMP site worker, Craig Bell, was undertaken on the 30 November 2021. Mr Bell has worked on the WMP site for almost 30 years and had grown up in Hokitika. The key points from the interview are provided below:

The early use of the property was as a milking farm. The southern end of the project area included part of a sawmill (owned by Stewart and Chapman) which was for the milling of native rimu timber and not pine (there was no pine on the west coast at that time). There was therefore no timber treatment activities and the tram on the tramway which serviced the mill was a small diesel unit. The houses along the tramway were accommodation for people working on the tramway, transporting timber.

12 Kaniere Road and 19 Town Belt East have been used as a lay down area for contractors' equipment, pipes, parts for the boilers and empty transport containers such as milk pods. The new shed contains scaffolding for one of the contractors. There is also a makeshift workshop (with a concrete floor) at 12 Kaniere Road that is used for metal repairs. One of the containers also contains some paint and painting implements used by a contractor, they are however unaware of any spills or staining evidence of spills.

3.5 HAIL Activities

The following HAIL activities (MfE, 2011b) are or have '*more likely that not*' been carried out within the project area:

D5 Engineering workshops with metal fabrication (shed within 12 Kaniere Road)

F8 Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances (19Town Belt East)

G5 Waste disposal to land (fill material in eastern side of 19Town Belt East)

In each of the above cases the activities are considered low risk for the following reasons:

- Small scale such as workshop activities within the shed within 12 Kaniere Road,
- likely low risk such as the transport yard containing only small quantities of dangerous goods
- The fill material has been tested and found to contain only low concentrations of contaminants

The possibility of contaminants migrating across from neighbouring activities was also considered. However, contaminant migration is unlikely due to the following:

- The truck stop has a modern secure above ground tank and that any leaks would be easily observed and stopped
- The substation is modern, and all equipment is a minimum of 15-20 m from the project area.

- The hardware and timber store is across gradient from the project area and a stormwater culvert along its boundary would likely drain any runoff.

4 RISK ASSESSMENT

4.1 Preliminary Conceptual Site Model

4.1.1 Potential Sources of Contamination

The following potential sources of contamination have been identified on the site:

- Engineering workshops with metal fabrication (shed within 12 Kaniere Road)
- Transport depots or yards including areas used for refuelling or the bulk storage of hazardous substances (19 Town Belt East)
- Waste disposal to land (fill material in eastern side of 19Town Belt East)

4.1.2 Potential Pathways

Potential environmental exposure pathways specific to the site are:

- Surface water draining to the Hokitika River
- Groundwater
- Windblown dust
- Direct contact by touching the soil

Currently the project area is covered by hardfill or vegetation limiting access to any contaminants present. This will also be the case post development. Disturbance during development will briefly expose soil and contaminants if present.

4.1.3 Potential Receptors

The identified potential receptors are listed below:

- The Hokitika River and biota
- Plants, birds in the project area
- Site users and workers

4.2 Exposure Assessment

Considering the potential sources are likely small and low risk, as described in Section 3.5 we consider that significant exposure from these sources is unlikely. Pathways to potential contaminants are also limited by hardfill coverage of most of the site which will be replaced during development. Also, the proposed use of the land as a roadway and transport area (same as current land use) is not considered a sensitive use. Should the use of the site change to a more sensitive end-use in the future, this assessment should be reviewed, and revised as appropriate, by a suitably qualified environmental practitioner (SQEP).

5 REGULATORY IMPLICATIONS

5.1 Regulatory Framework

The following documents contain rules relating to contaminated sites: ·

- The National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS); and
- West Coast Regional Plan section 18.5.3 Discretionary Discharges to Land.

The rules in the NES-CS (MfE, 2011c) aim to protect human health while the rules in the West Coast Regional Plan are written to protect the wider environment (ground and surface water bodies, ecological receptors etc.). The need, or otherwise, for contamination related resource consents for the development of site has been evaluated against these regulatory requirements in Sections 5.2 and 5.3, respectively.

5.2 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

The NES-CS applies to specific activities on sites where an activity on the MfE HAIL list has, or is, more likely than not to have occurred. Activities covered under the NES-CS include removal of fuel storage systems, soil sampling soil disturbance, subdivision and changing the landuse. Table 2, which is based on the template provided in MfE (2012), confirms the NES-CS applies to the site.

Table 2. NES-CS checklist

Is an activity described on the HAIL currently being undertaken on the piece of land to which this application applies?	Yes
Has an activity described on the HAIL ever been undertaken on the piece of land to which this application applies?	Yes
Is it more likely than not that an activity described on the HAIL is being or has been undertaken on the piece of land to which this application applies?	Yes
If 'Yes' to any of the above, then the NES for Assessing and Managing Contaminants in Soil to Protect Human Health may apply. Check the five activities to which the NES applies:	
Is the activity you propose to undertake removing or replacing a fuel storage system or parts of it?	No
Is the activity you propose to undertake sampling soil?	No
Is the activity you propose to undertake disturbing soil?	Yes
Is the activity you propose to undertake subdividing land?	No
Is the activity you propose to undertake changing the use of the land?	No
If also 'Yes' to any of the above activities, then the NES for Assessing and Managing Contaminants in Soil to Protect Human Health is likely to apply.	

An assessment of the site in accordance with the permitted activity criteria in the NES-CS is provided in Table 3. This assessment shows that proposed development may be a Permitted Activity or Controlled Activity depending on the timing and extent of the required works.

Table 3. Assessment against Permitted Activity Criteria

Permitted Activity Criteria		**Compliance?**
8(3) Disturbing Soil		
(a)	controls to minimise the exposure of humans to mobilised contaminants must: (i) be in place when the activity begins. (ii) be effective while the activity is done. (iii) be effective until the soil is reinstated to an erosion-resistant state.	Yes, earth works controls will be in place during development.
(b)	the soil must be reinstated to an erosion-resistant state within 1 month after the serving of the purpose for which the activity was done.	Unknown
(c)	the volume of the disturbance of the soil of the piece of land must be no more than 25 m^3 per 500 m^2.	Unknown, however the maximum volume of soil permitted to be disturbed from the site under this rule would be approximately 500m^3
(d)	soil must not be taken away in the course of the activity, except that: (i) for the purpose of laboratory analysis, any amount of soil may be taken away as samples. (ii) for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year.	Unknown, however the maximum volume of soil permitted to be removed from the site under this rule would be approximately 100m^3
(e)	soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind.	Yes, any soil taken away will be disposed to a licensed facility
(f)	the duration of the activity must be no longer than 2 months.	Unknown
(g)	the integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.	Not relevant

Permitted Activity Criteria		Compliance?
8 (4) Subdividing or Changing Landuse		
(a)	a preliminary site investigation of the land or piece of land must exist	This document.
(b)	the report on the preliminary site investigation must state that it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land	Potential sources of contamination identified are considered small and low risk.
(c)	the report must be accompanied by a relevant site plan to which the report is referenced	Included in this document.
(d)	the consent authority must have the report and the plan	This document will be provided at the time of consent application.

5.3 West Coast Regional Plan

West Coast Regional Plan section 18.5.3 identifies that any discharges to land other than clean filling are discretionary activities. It is understood that the proposed works will only include the importation of clean fill and therefore a permitted activity.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The contaminated status of the project area has been confirmed as "Potentially Contaminated" due to the activities that have taken place. Therefore, the NES-CS applies to the project area. However, the potential sources are likely small and of low risk, and it is considered that significant contaminant discharges from these sources is unlikely. Also, the proposed use of the land as a roadway and transport area (same as current land use) is not considered a sensitive use.

West Coast Regional Plan section 18.5.3 identifies that any discharges to land other than clean filling are discretionary activities. It is understood that the proposed works will only include the importation of clean fill so regional consent will not be required.

This assessment also shows that proposed development may be a Permitted Activity or Controlled Activity depending on the timing and extent of the required works.

6.2 Recommendations

Commensurate with the low risk we recommend the following be undertaken prior to undertaking the works:

- Confirmation of timing and extent of the required work, and an assessment made if consent is required.
- Sampling and analysis of soil in the areas to be disturbed is undertaken prior to disturbance.
- Determine appropriate handling and disposal if contaminated material is encountered by way of a management plan.

7 REFERENCES

Google, 2021a. *Google Earth.* [Online]
Available at: https://www.google.com/earth/
[Accessed June 2021].

LGGA, 2021c. *Retrolens.* [Online]
Available at: http://retrolens.nz/
[Accessed July 2021].

MfE, 2002. *A Guideline to the Management of Cleanfills,* Wellington: MfE.

MfE, 2011a. *Contaminated Land Management Guidelines No.1 – Reporting on Contaminated sites in New Zealand,* Wellington: Ministry for the Environment.

MfE, 2011b. *Hazardous Activities and Industries List (HAIL),* Wellington: Ministry for the Environment.

MfE, 2011c. *National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations 2011,* Wellington: Ministry for the Environment.

NZGD, 2021b. *New Zealand Geological Database.* [Online]
Available at: https://www.nzgd.org.nz/
[Accessed 22 December 2021].

APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of Westland Milk Products as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions. Where opinions or judgements are to be relied on they should be independently verified with appropriate legal advice.

Maps and Images

All maps, plans, and figures included in this report are indicative only and are not to be used or interpreted as engineering drafts. Do not scale any of the maps, plans or figures in this report. Any information shown here on maps, plans and figures should be independently verified on site before taking any action. Sources for map and plan compositions include LINZ Data and Map Services and local council GIS services. For further details regarding any maps, plans or figures in this report, please contact Babbage Consultants Limited.

Appendix A

Selected Aerial Photos

JOBN **MAPN** **RN** Westland Milk Products

1943 Aerial Photo

13/12/21 MJC

SCALE **@ A4 1:1,000**

Aerial photo Retrolense 2022

Town Belt East Road Exchange

Legend

- Property Names
- Extent of PSI
- Proposed New Road

Babbage

DISCLAIMER:
This map/plan is not an engineering draft.
This map/plan is illustrative only and all information should be independently verified on site before taking any action.

SOURCES
Road and Legal data: QuickMap v7.5.185
Aerial Photography: LINZ Online Database

JOBN **MAPN** **RN** Westland Milk Products

1963 Aerial Photo

13/12/21 MJC

SCALE **@ A4 1:1,000**

Aerial photo Retrolense 2022

Town Belt East Road Exchange

Legend

- Property Names
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- Proposed New Road

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SOURCES
Road and Legal data: QuickMap v7.5.185
Aerial Photography: LINZ Online Database

JOBN **MAPN** **RN** Westland Milk Products

1970 Aerial Photo

13/12/21 MJC

SCALE **@ A4 1:1,000**

Aerial photo Retrolense 2022

Town Belt East Road Exchange

Legend

- Property Names
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DISCLAIMER:
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SOURCES
Road and Legal data: QuickMap v7.5.185
Aerial Photography: LINZ Online Database

JOBN **MAPN** **RN** Westland Milk Products

1988 Aerial Photo

13/12/21 MJC

SCALE **@ A4 1:1,000**

Aerial photo Retrolense 2022

Town Belt East Road Exchange

Legend

- Property Names
- Extent of PSI
- Proposed New Road

Babbage

SOURCES
Road and Legal data: QuickMap v7.5.185
Aerial Photography: LINZ Online Database

DISCLAIMER:
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JOBN **MAPN** **RN** Westland Milk Products

2013 Aerial Photo

13/12/21 MJC

SCALE **@ A4 1:1,000**

Aerial photo Retrolense 2022

Town Belt East Road Exchange

SOURCES
Road and Legal data: QuickMap v7.5.185
Aerial Photography: LINZ Online Database

Legend

- Extent of PSI
- Proposed New Road

Babbage

DISCLAIMER:
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JOBN **MAPN** **RN** Westland Milk Products

2018 Aerial Photo

13/12/21 MJC

SCALE **@ A4 1:1,000**

Aerial photo Retrolense 2022

Town Belt East Road Exchange

SOURCES
Road and Legal data: QuickMap v7.5.185
Aerial Photography: LINZ Online Database

Legend

- Extent of PSI
- Proposed New Road

Babbage®

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JOBN **MAPN** **RN** Westland Milk Products

2021 Aerial Photo

13/12/21 MJC

SCALE **@ A4 1:1,000**

Aerial photo Retrolense 2022

Town Belt East Road Exchange

SOURCES
Road and Legal data: QuickMap v7.5.185
Aerial Photography: LINZ Online Database

Legend

- Extent of PSI
- Proposed New Road

Babbage

DISCLAIMER:
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Appendix B

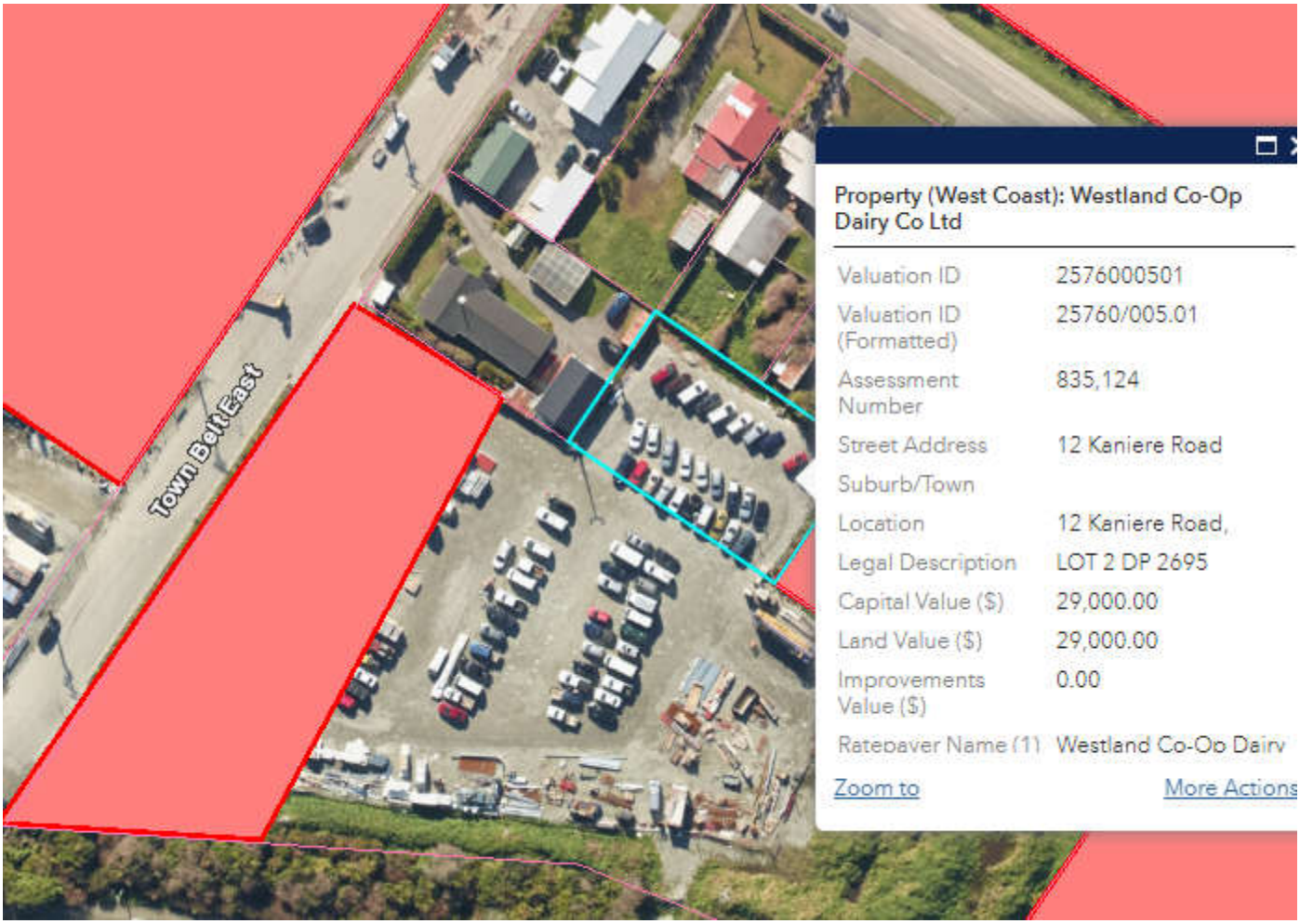
Selected Land Use Sites Register Query

Mark Crooks

From: Emma Perrin-Smith <emmaps@wcrc.govt.nz>
Sent: Wednesday, 27 October 2021 2:32 PM
To: Mark Crooks
Subject: RE: Site enquiry

Good afternoon Mark,

I have double checked that and yes you are correct, 12 Kaniere Rd is the car park next to the section I had previously highlighted.



That site is also not on our register.
This is why I like to double check I have the correct locations!

Cheers,
Emma

From: Mark Crooks <mark.crooks@babbage.co.nz>
Sent: Thursday, October 21, 2021 12:14 AM
To: Emma Perrin-Smith <emmaps@wcrc.govt.nz>
Cc: Denise Cassidy <dcas@wcrc.govt.nz>
Subject: RE: Site enquiry

Thanks Emma,

That's most helpful.

Actually, I though 12 Kaniere Rd was the car-parking area to the southeast of the highlighted property? Maybe that is part of 10 Kaniere Rd? However, it is a separate parcel so not clear.

Cheers
Mark

From: Emma Perrin-Smith <emmaps@wcrc.govt.nz>
Sent: Wednesday, 20 October 2021 4:40 PM
To: Mark Crooks <mark.crooks@babbage.co.nz>
Cc: Denise Cassidy <dcas@wcrc.govt.nz>
Subject: Site enquiry

Good afternoon Mark,

I have checked our register for these sites and can confirm that 10 Kaniere Rd and 0 Town Belt East are on the WCRC Selected Land Use register.
12 Kaniere Rd is highlighted on the map below (can you confirm his is the correct location). This is not on our register.

Figure 1

We do not have much on file for these sites other than the information I have attached in the site reports.

Thanks,

Emma Perrin-Smith
Senior Water Quality Technician
Tel. 03 744 7325| Mob. 021 191 1599
E: emmaps@wcrc.govt.nz

PO Box 66, Greymouth 7840
388 Main South Road
www.wcrc.govt.nz

Hi There,

I would like to request information from your Selected Land Use Sites (SLUS) register query for number 10 Kaniere Road, Hokitika (LOT 1 DP 2695), 12 Kaniere Road, Hokitika (LOT 2 DP 2695) and number 0 Town Belt East, Hokitika (LOT 3 DP 2695).

Also, any other information on the potential contamination of these properties that you may have.

Thanks so much in advance.

Cheers

Mark Crooks
Senior Environmental Scientist - Environmental Science

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Appendix C

Environmental Report

Memorandum

To	Shane Skinner
Copy	
From	Christopher Bergin
Office	Greymouth
Date	23 August 2021
File/Ref	6-WWES4.17
Subject	Butter Factory - Baseline report

1 Introduction

WSP New Zealand Ltd (WSP) were requested by Westland Milk Products Ltd (WMP) to undertake sampling of the soils at the location of a containment cell prepared to store and encapsulate fill which had been excavated as part of the construction of a new butter factory. The purpose of the sampling is to characterise contaminant levels in the soils prior to importation of fill materials and to establish a baseline level of contaminants present in the soils.

Soil samples were collected for comparison against relevant soil guideline values, soil contamination standards and predicted background concentrations for heavy metals and petroleum hydrocarbons.

2 Site Description

Table 2-1 outlines a description of the site.

Table 2-1: Site Description

Site Address	
Legal Description	LOT 3 DP 2695
Approximate total site area	9349 m^2
NES Permitted Activity threshold volumes for 1) disturbance, and 2) yearly off-site movement of soil based on the approximate site area	1) 467m^3 2) 93.5m^3
Territorial Authority	Westland District Council.
Current Site Use	Small Settlement Zone.
Proposed Site Use	Commercial/Industrial.
Adjoining Sites Uses	North: Rural.

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	South: Hokitika River. East: Residential. West: Industrial.
Topography	The site is generally on level ground.
Site Observations:	Site Photos taken during this inspection are presented in Appendix A.
Flood Potential:	The site is outside the ponding flood hazard zone.
Visible Contamination Sources:	During the visit to site, no potential contaminants were observed on the site.
Odours:	None noted.
Surface Water:	No water ponding was noted at the site. The weather conditions were fine with moderate cloud cover.
Vegetation stress	Vegetation at the property did not show any evidence of stress or die off.
Surface Water Bodies	The closest body of water is the Hokitika River approximately 60m south from the property boundary. This waterway flows west towards the Tasman Sea.

3 Sampling and Analysis

3.1 Site Walkover

WSP inspected the ground conditions during a site walkover on 5 August 2021. The layout of the ground has been modified with the ground excavated, and soils moved and mounded to form a rectangular soil containment cell (see photos in Appendix A). No evidence of vegetation stress, pooling of surface water, oily slicks or chemicals were noted during the site visit. Figure 3-1 shows the site layout prior to earthworks.

Figure 3-1: Aerial plan

3.2 Sampling and analysis rational

Six shallow test pits identified as TP1 – TP6 were sampled in the base and side walls of the containment area. Samples collected were tested for the presence of heavy metals, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAH) and BTEX as contaminants of priority[1] . The type of contaminants in soil were tested based on findings from the Butter Factory from the Details Site Investigation and the need to establish baseline soil contamination data.

3.3 Soil Investigation Methodology

WSP excavated soil samples from locations TP1 – TP6 from hand dug test pits down to 0.15m bgl. The location of samples taken was from across the base of the containment cell (TP's 1-4) and within the west and east side walls (TP5 & TP6). A systematic grid sampling approach was taken to obtain a representative assessment of ground conditions across the proposed containment area.

Each sample was collected using a clean pair of nitrile gloves. Soil samples were placed directly into labelled, laboratory supplied sample containers, placed into chilled storage and transported via courier, under standard chain of custody (CoC), to Hill Laboratories (Hills) for

[1] Ministry for the Environment. 2011. Toxicological Intake Values for Priority Contaminants in Soil. Wellington: Ministry for the Environment.

analysis. Hills are IANZ accredited for the analysis undertaken. The CoC documentation is included in Appendix B.

Photographs taken during the investigation are provided as Appendix A.

Table 3-1: Test pit locations

4 Field Quality Assurance

Sampling was completed on 5 August 2021. Weather conditions were overcast with occasional showers.

Six soil samples were collected from the site and sent to Hill Laboratories for testing. Samples were collected at depths of 0.15m below ground level (bgl) for samples TP1 – TP6.

Samples were submitted on the day of sample collection, and samples were chilled prior to dispatch and during storage. Details regarding decontamination procedures between samples have been provided in section 4.2 of this report.

4.1 Laboratory QA/QC

The field and laboratory quality assurance and quality control (QA/QC) program as was based on data quality indicators (DQIs) chosen to assess the suitability of the dataset. These are discussed in the following sections.

4.2 Field Quality Program

Table 3-1 summarises the field quality program for the SVR.

Table 4-1: Field Quality Programme

ITEM	QUALITY PROCESS
Environmental consultant	The environmental consultant maintains Quality Assurance Systems certified to AS/NZS ISO 9001:2000. Qualified and experienced personnel with at least 5 years' experience completed the field works.
Procedures	All work was conducted in accordance with relevant statutory health, safety and environmental (HSE) sampling guidelines, as well as standard company HSE and environmental field procedures. Standard field sampling sheets were used. Details recorded included WSP staff time on/off-site, weather conditions, calibration records and other observations relevant to the works.
Sampling	Collection of samples was undertaken by appropriately qualified and experienced personnel following WSP standard field procedures which are based on industry accepted standard practice. Chain of custody was used to ensure the integrity of samples from collection to receipt by the laboratory.
Equipment decontamination	Undertaken after each sampling episode where equipment used was not dedicated. Field sampling procedures conformed to WSP QA/QC protocols to prevent cross contamination, preserve sample integrity, and allow for collection of a suitable data set from which to make technically sound and justifiable decisions with data of satisfactory usability
Transportation	Samples were stored in chilled coolers on-site and during transport by the field scientist to the laboratory. Chain of custody forms were completed on-site and sent with the samples. Chain of custody forms are presented with laboratory reports in Appendix C, and include the sampler's name, date of sampling, sample matrix, sample containers and preservation used, and analysis requested.

	The laboratory confirmed receipt of the samples and specified the condition on delivery and the scheduled analyses. Laboratory sample receipt documentation indicated that appropriate holding times were met for the primary laboratory and intra-laboratory duplicates.
Reporting	Report generally complies with the MfE CLMG No. 1.

5 QA/QC Data Evaluation

5.1 Consistency

Consistent and repeatable sampling techniques and methods were utilised. The same samplers and methodology were used for all sampling locations. The sampling was in general accordance with the sampling and analysis procedures and as per standard industry procedures.

Each sample was analysed using identical methods for each analyte and laboratory practical quantitation limits (PQLs) were consistent over each laboratory batch.

5.2 Completeness

All critical samples were analysed for the contaminants of concern identified at the site. Appropriate methods and PQLs were adopted for the investigation. All sample documentation was completed appropriately and sample holding times were complied with.

5.3 Summary

WSP considers the sample collection, documentation, handling, storage and transportation procedures utilised are of an acceptable standard and the analytical results provided by the laboratories are deemed reliable and complete, therefore the data are considered fit for purpose.

It is considered that the QA/QC procedures and results were acceptable and that the conclusions of the report have not been significantly affected by the sampling or analytical procedures.

6 Basis for Guidelines

6.1 Hierarchy of Selection

This section summarises the reference sources for guideline values that we have adopted for the proposed future use of the site. The selected guidelines have been based on the MfE CLMG No. 2 hierarchy of guideline preference below (MFE, 2011).

6.1.1 Handling and Landuse

WSP have adopted the following guideline criteria to classify soil at the site during handling and ongoing/future site use. We have adopted these guidelines based on the intended final use of the site and the MfE CLMG No. 2 hierarchy of guideline preference (MFE, 2011).

Table 6-1: Selection Criteria for Handling and Land use Assessment

Matrix	Source Guideline	Land use criteria
Soil	Summary of soil contaminant standards (shaded) and guideline values for inorganic substances[2]	Commercial/Industrial & Rural
Soil	Summary of soil contaminant standards (shaded) and guideline values for organic substances[3]	Commercial/Industrial & Rural

Soil Guideline Values (SGVs) for the range of determinants identified in section 4.2 above have been selected from Table B2 of the Ministry for the Environment's "Contaminated Land Management Guidelines (CLMGs) – Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health."

The site is in an area zoned "Small Settlement Zone" within the active Westland District Plan. The purpose of the investigation is to determine the existing soil chemical characteristics in the containment cell constructed to contain the overburden excavated during construction of the new butter factory. On this basis, as outlined in Table 6-2, a "Commercial/Industrial" land use has

[2] Ministry for the Environment (MfE) Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (Revised 2011) Table 54
[3] Ministry for the Environment (MfE) Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (Revised 2011) Table 55

been selected as most appropriate with the proposed development. As such, this category is considered to provide the best fit for the land use description.

Soil Guideline Values (SGVs) for heavy metals have been selected from Table B2 of the Ministry for the Environment's "Contaminated Land Management Guidelines (CLMGs) – Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health."

The WDC have no available data on background concentrations of common contaminants in soils. Therefore, results are compared with expected background values in alluvial soils obtained from 'Predicted Background Soil Concentrations, New Zealand: Landcare Research' https://lris.scinfo.org.nz/layer/48470-pbc-predicted-background-soil-concentrations-new-zealand/ as an indicator of the level of contamination present.

Table 6-2: NESCS Soil Contaminant Standards for health (SCS (health)) for inorganic substances[4]

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

[4] Values found in "Table B2 – Soil Contaminant Standards for health (SCS (health)) for inorganic substances" from "Users' Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health" – Land use: Recreation

Table 6-3: NESCS Soil Contaminant Standards for health (SCS (health)) for organic substances[5]

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

Notes: All concentrations refer to dry weight (ie, mg/kg dry weight or µg/kg dry weight).

[1] For benzo(a)pyrene, the equivalent BaP concentration is calculated as the sum of each of the detected concentrations of nine carcinogenic PAHs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene and indeno(1,2,3-cd) pyrene), multiplied by their respective potency equivalency factors (see table 40 of the *Methodology*).

[2] The SCS is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrin if both are involved.

TEQ = Toxic equivalency, an indication of the toxicity of a mixture of compounds.

For dioxins and dioxin-like PCBs the total toxicity is assessed as a toxic equivalency (TEQ) to 2,3,7,8-TCDD using toxic equivalency factors (TEF). The TEQ is defined as the sum of the products of the concentration of each compound multiplied by the value of its TEF (see table 46 of the *Methodology*).

[5] Ministry for the Environment (MfE) Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (Revised 2011) Table 55

7 Investigation Findings

7.1 Soil Conditions

WSP staff made the following observations during the soil sampling:

- No visible odour;
- No evidence of oil slicks;
- The soil appeared to comprise fill consisting of silts, sands and gravels;
- Groundwater was not encountered in the test pits.

The soil types encountered during the investigation are summarised in Table 7-1.

Table 7-1: Soil in Test pits

Sample Name	Depth (m bgl)	Soil Type
TP1 - TP6	0.15	Loamy soils with some gravel

7.2 Analytical Results

A summary of analytical results are shown in Table 7-2

7.2.1 Heavy metals

The six samples tested for heavy metals were collected in selected locations across the site. Lead was found in TP2 and TP5 at levels above predicted background. All other samples meet the SCS levels for an industrial/commercial land use at the site and fall below predicted background levels.

7.2.2 Hydrocarbons

Three congeners of PAH were found in TP1 above levels of detection. Because background levels for PAHs in soils do not exist for this site, detections of congeners above the limit of detection are considered to exceed background levels.

One sample at TP1 exceeded the predicted background level for ethylbenzene.

No TPH soil guideline values (SGV) were exceeded in any of the soil samples tested.

The analytical report, as received from the laboratory, is provided in Appendix C.

Table 7-2: Analytical Results Summary

Analyte		Concentration (mg/kg)		Samples exceeding criteria		
		Minimum	Maximum	Background	Class 1 Disposal	Human Health
Metals – total 10 samples	Arsenic	<2	<4	0	0	0
	Cadmium	<0.1	0.3	0	0	0
	Chromium	8	26	0	0	0
	Copper	8	14	0	0	0
	Lead	15.6	31	2	0	0
	Nickel	4	8	0	0	0
	Zinc	17	40	0	0	0
PAH – total 3 samples	Acenaphthylene	<0.017	<0.04	0	0	0
	Acenaphthylene	<0.017	<0.04	0	0	0
	Anthracene	<0.017	<0.04	0	0	0
	Benzo(a)anthracene	<0.017	<0.04	0	0	0
	Benzo(a)pyrene	<0.017	<0.04	0	0	0
	Benzo(b)fluoranthene	<0.017	0.05	1	0	0
	Benzo(g,h,i)perylene	<0.017	<0.04	0	0	0
	Benzo(k)fluoranthene	<0.017	<0.04	0	0	0
	Chrysene	<0.017	<0.04	0	0	0
	Dibenzo(a,h)anthracene	<0.017	<0.04	0	0	0
	Fluoranthene	<0.017	0.05	1	0	0
	Fluorene	<0.017	<0.04	0	0	0
	Indeno (1,2,3-c, d) pyrene	<0.017	<0.1	0	0	0
	Naphthalene	<0.016	<0.04	0	0	0
	Phenanthrene	<0.017	<0.04	0	0	0
	Pyrene	<0.017	0.05	1	0	0
	B(a)P Equivalent[1]	0.041	0.098	0	0	0
TPH/BTEX – total 6 samples	TPH C7 – C9	<10	<19	0	0	0
	TPH C10 - C14	<20	<40	0	0	0
	TPH C15 - C36	61	340	0	0	0
	Benzene	<0.09	<0.3	0	0	0
	Toluene	<0.09	<0.3	0	0	0
	Ethylbenzene	<0.09	0.3	1	0	0
	Xylenes	<0.09	<0.3	0	0	0

[1]Sum of 9 carcinogenic polycyclic aromatic hydrocarbons (PAHs) of variable toxicity; each is multiplied by a potency factor related to benzo(a)pyrene (BaP) to give an equivalent BaP toxicity.

8 Appendix A Site Photos

Photo 1 -North elevation

Photo 2- West elevation

Photo 3 -South elevation

Photo 4 -East elevation

Photos 5 & 6 - Test pit locations

Photo 7 - Containment pit

9 Appendix B Chain of Custody

Hill Laboratories
TRIED, TESTED AND TRUSTED

ANALYSIS REQUEST

R J Hill Laboratories Limited
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T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Office use only (Job No)

Quote No

Primary Contact	Christopher Bergin	164203
Submitted By	Christopher Bergin	164203
Client Name	WSP New Zealand Limited	25519

Address 23 High Street
Greymouth 7805, New Zealand

Phone 03 768 7179 *Mobile*

Email ~~Anita.Hoffman@wsp.com~~ christopher.bergin@wsp.com

Charge To

Client Reference

Additional Client Ref

Order No

Results To *Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.*

☑ *Email Primary Contact* ☐ *Email Submitter* ☐ *Email Client*

☐ *Email Other*

☐ *Other*

Dates of testing are not routinely included in the Certificates of Analysis. Please inform the laboratory if you would like this information reported.

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories
Date & Time: 5/8/21
Name: C Bergin
☑ *Tick if you require COC to be emailed back*
Signature:

Received at Hill Laboratories
Date & Time:
Name:
Signature:

Condition *Temp:*
☐ *Room Temp* ☐ *Chilled* ☐ *Frozen*

☐ Sample & Analysis details checked
Signature:

ADDITIONAL INFORMATION / KNOWN HAZARDS

N.I

Priority ☐ Low ☑ Normal ☐ High

☐ **Urgent** (ASAP, *extra charge applies, please contact lab first*)

Requested Reporting Date:

Quoted Sample Types

No.	Sample Name	Sample Date/Time	Sample Type	Tests Required
1	CB0177 TP1	5/8/21 11:15	Soil	Heavy metals (screen) TPH | PAH | BTEX
2	CB0179 TP2	11:20	"	"
3	CB0179 TP3	11:25	"	"
4	CB0180 TP4	11:30	"	"
5	CB0181 TP5	11:35	"	"
6	CB0182 TP6	11:40	"	"
7				
8				

10 Appendix C Laboratory Report

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Certificate of Analysis

Client:	WSP New Zealand Limited	**Lab No:**	2672726 SPv2
Contact:	Christopher Bergin	**Date Received:**	06-Aug-2021
	C/- WSP New Zealand Limited	**Date Reported:**	12-Aug-2021
	23 High Street	**Quote No:**	82748
	Greymouth 7805	**Order No:**	
		Client Reference:	
		Submitted By:	Christopher Bergin

Sample Type: Soil

Sample Name:		CB0177 TP1 05-Aug-2021 11:15 am	CB0178 TP2 05-Aug-2021 11:20 am	CB0179 TP3 05-Aug-2021 11:25 am	CB0180 TP4 05-Aug-2021 11:30 am	CB0181 TP5 05-Aug-2021 11:35 am
Lab Number:		2672726.1	2672726.2	2672726.3	2672726.4	2672726.5
Individual Tests						
Dry Matter	g/100g as rcvd	31	54	49	51	59
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 4	< 4	< 2	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	0.3	< 0.19	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	8	20	26	22	25
Total Recoverable Copper	mg/kg dry wt	12	8	14	11	13
Total Recoverable Lead	mg/kg dry wt	15.6	31	24	22	30
Total Recoverable Nickel	mg/kg dry wt	< 4	4	7	6	8
Total Recoverable Zinc	mg/kg dry wt	40	18	23	25	39
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.3	< 0.10	< 0.11	< 0.11	< 0.09
Toluene	mg/kg dry wt	< 0.3	< 0.10	< 0.11	< 0.11	< 0.09
Ethylbenzene	mg/kg dry wt	0.3	< 0.10	< 0.11	< 0.11	< 0.09
m&p-Xylene	mg/kg dry wt	< 0.6	< 0.19	< 0.3	< 0.3	< 0.17
o-Xylene	mg/kg dry wt	< 0.3	< 0.10	< 0.11	< 0.11	< 0.09
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.8	< 0.5	< 0.5	< 0.5	< 0.5
1-Methylnaphthalene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
2-Methylnaphthalene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Acenaphthylene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Acenaphthene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Anthracene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Benzo[a]anthracene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.08	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.08	< 0.05	< 0.05	< 0.05	< 0.05
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.05	< 0.018	< 0.02	< 0.019	< 0.017
Benzo[e]pyrene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Benzo[k]fluoranthene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Chrysene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Fluoranthene	mg/kg dry wt	0.05	< 0.018	< 0.02	< 0.019	< 0.017
Fluorene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017

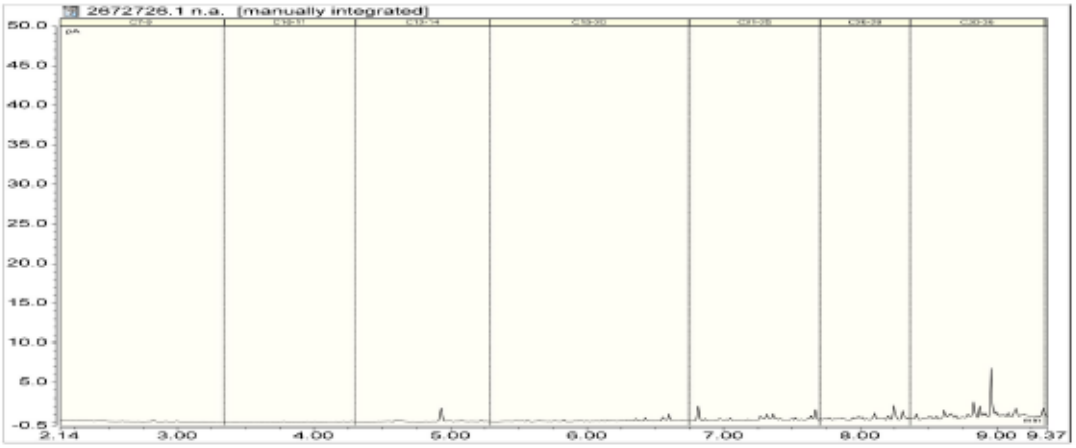
This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported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

Sample Type: Soil						
Sample Name:		CB0177 TP1 05-Aug-2021 11:15 am	CB0178 TP2 05-Aug-2021 11:20 am	CB0179 TP3 05-Aug-2021 11:25 am	CB0180 TP4 05-Aug-2021 11:30 am	CB0181 TP5 05-Aug-2021 11:35 am
Lab Number:		2672726.1	2672726.2	2672726.3	2672726.4	2672726.5
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Naphthalene	mg/kg dry wt	< 0.16	< 0.09	< 0.10	< 0.10	< 0.09
Perylene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Phenanthrene	mg/kg dry wt	< 0.04	< 0.018	< 0.02	< 0.019	< 0.017
Pyrene	mg/kg dry wt	0.05	< 0.018	< 0.02	< 0.019	< 0.017
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 19	< 11	< 12	< 12	< 11
C10 - C14	mg/kg dry wt	< 40	< 30	< 30	< 30	< 30
C15 - C36	mg/kg dry wt	340	123	83	138	61
Total hydrocarbons (C7 - C36)	mg/kg dry wt	350	128	86	147	< 80

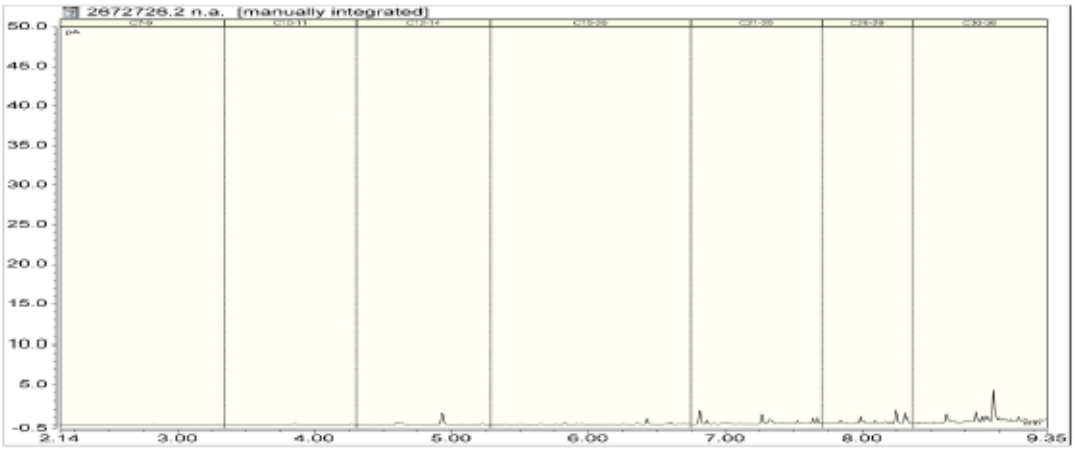
Sample Name:		CB0182 TP6 05-Aug-2021 11:40 am				
Lab Number:		2672726.6				
Individual Tests						
Dry Matter	g/100g as rcvd	59	-	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 5	-	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.3	-	-	-	-
Total Recoverable Chromium	mg/kg dry wt	22	-	-	-	-
Total Recoverable Copper	mg/kg dry wt	9	-	-	-	-
Total Recoverable Lead	mg/kg dry wt	23	-	-	-	-
Total Recoverable Nickel	mg/kg dry wt	< 5	-	-	-	-
Total Recoverable Zinc	mg/kg dry wt	17	-	-	-	-
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.14	-	-	-	-
Toluene	mg/kg dry wt	< 0.14	-	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.14	-	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.3	-	-	-	-
o-Xylene	mg/kg dry wt	< 0.14	-	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.017	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.017	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.017	-	-	-	-
Acenaphthene	mg/kg dry wt	< 0.017	-	-	-	-
Anthracene	mg/kg dry wt	< 0.017	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.017	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.017	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.05	-	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.05	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.017	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.017	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.017	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.017	-	-	-	-
Chrysene	mg/kg dry wt	< 0.017	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.017	-	-	-	-
Fluoranthene	mg/kg dry wt	< 0.017	-	-	-	-
Fluorene	mg/kg dry wt	< 0.017	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.017	-	-	-	-
Naphthalene	mg/kg dry wt	< 0.09	-	-	-	-
Perylene	mg/kg dry wt	< 0.017	-	-	-	-
Phenanthrene	mg/kg dry wt	< 0.017	-	-	-	-

Sample Type: Soil						
Sample Name:		CB0182 TP6 05-Aug-2021 11:40 am				
Lab Number:		2672726.6				
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Pyrene	mg/kg dry wt	< 0.017	-	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 10	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	104	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	111	-	-	-	-

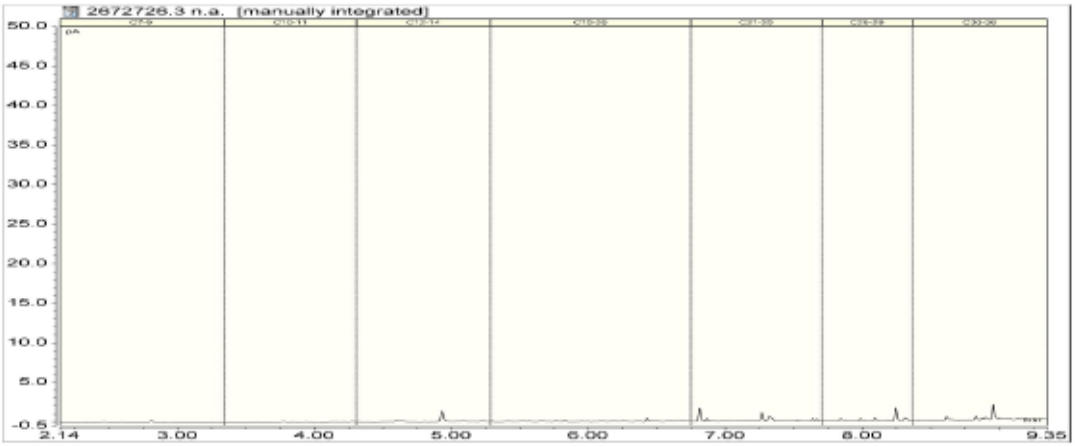
2672726.1
CB0177 TP1 05-Aug-2021 11:15 am
Client Chromatogram for TPH by FID



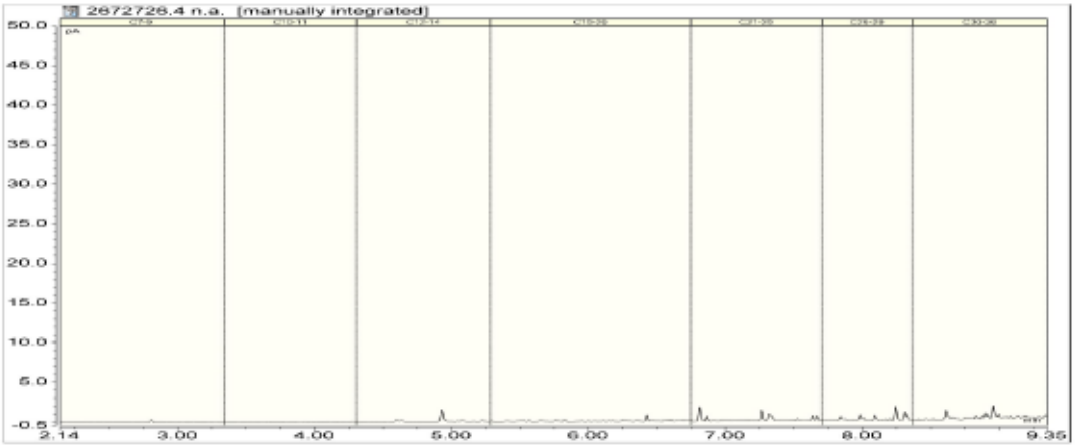
2672726.2
CB0178 TP2 05-Aug-2021 11:20 am
Client Chromatogram for TPH by FID



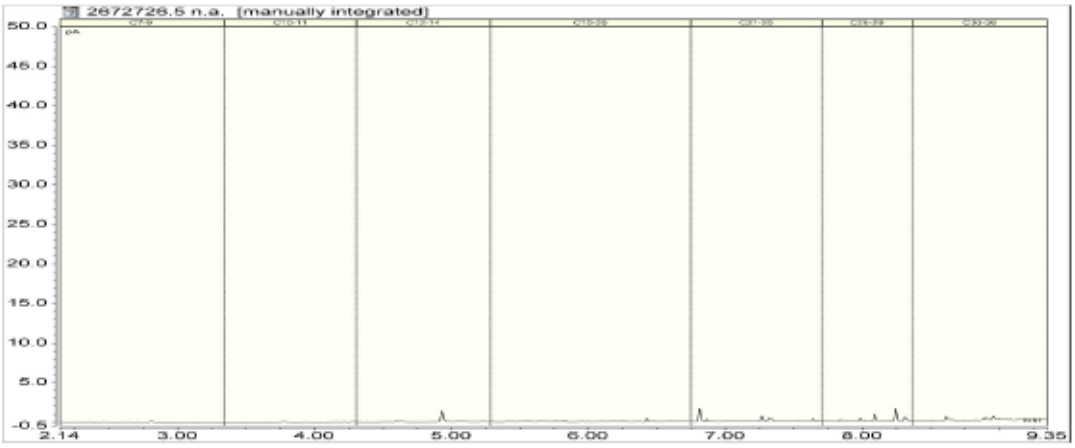
2672726.3
CB0179 TP3 05-Aug-2021 11:25 am
Client Chromatogram for TPH by FID



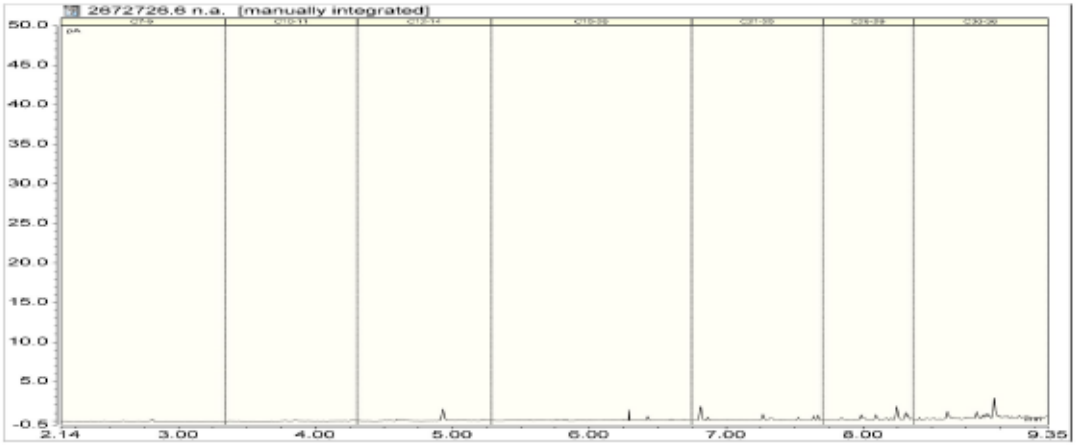
2672726.4
CB0180 TP4 05-Aug-2021 11:30 am
Client Chromatogram for TPH by FID



2672726.5
CB0181 TP5 05-Aug-2021 11:35 am
Client Chromatogram for TPH by FID



2672726.6
CB0182 TP6 05-Aug-2021 11:40 am
Client Chromatogram for TPH by FID



Analyst's Comments

It was observed that the container(s) for sample(s) {2672726.2,3,4,5,6} were not completely filled. Volatile loss may have occurred due to the headspace created in the container.

Summary of Methods

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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-6
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-6
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-6
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.002 mg/kg dry wt	1-6
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.002 mg/kg dry wt	1-6
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	1-6
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	1-6
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.002 - 0.05 mg/kg dry wt	1-6
TPH + PAH + BTEX profile	Sonication extraction, GC-FID and GC-MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.002 - 70 mg/kg dry wt	1-6
Total Petroleum Hydrocarbons in Soil			

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	1-6
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	8 mg/kg dry wt	1-6
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-6
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-6
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	70 mg/kg dry wt	1-6

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

Testing was completed between 10-Aug-2021 and 12-Aug-2021. For completion dates of individual analyses please contact the laboratory.

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

Ara Heron BSc (Tech)
Client Services Manager - Environmental