

Appendix 11: Detailed site investigation

WASHDYKE SEADOWN DRAIN

ENVIRONMENT

45564 / WASHDYKE SEADOWN DRAIN / ENVIRONMENT
CANTERBURY



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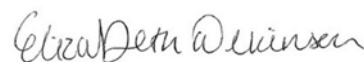
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Coastal erosion and inundation are causing the retreat of the coastline and therefore the existing Washdyke Lagoon drain is required to be relocated further inland to prevent saltwater intrusion. Environment Canterbury (ECan) are therefore planning to relocate the drain with an initial proposed route presented in orange in **Figure 1**.

ECan engaged Davis Ogilvie to complete a Detailed Site Investigation (DSI) of land along the proposed route and specifically the land within 50 m either side of the proposed realignment (herein referred to as 'the site').

We understand ECan is proposing a stormwater re-alignment starting near Meadows Road and heading north under Aorangi Road, then crossing between Timaru District Council (TDC) wastewater treatment ponds and the Seadown Shooting complex (refer to **Appendix B**).

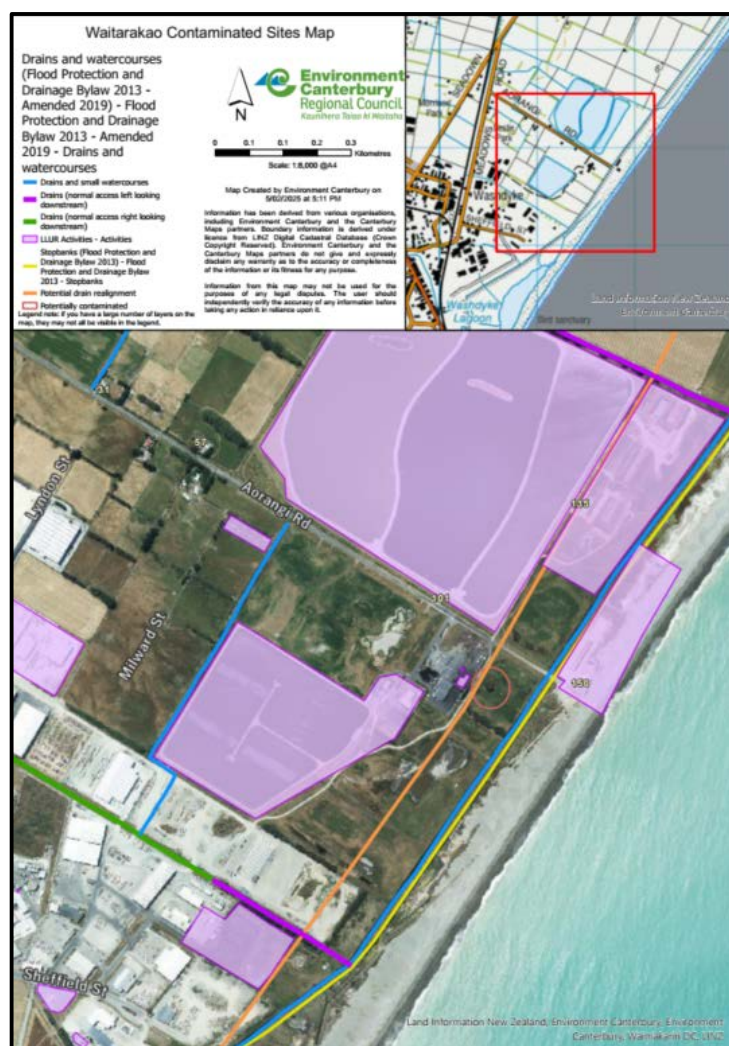


Figure 1: Proposed Stormwater realignment (shown in orange) and sites on Listed Land Use Register (LLUR) (shown in purple).

1.1 Background

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCSCS) apply to certain activities on sites that have, have had, or are more likely than not to have had an activity on the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) carried out on them.

Soil disturbance, which is required for development of the drain, is an activity covered by the NESCSCS. Therefore, to assess regulatory compliance and assist with initial soil waste classification an investigation of the site was necessary.

This DSI was undertaken in general accordance with:

- MfE 2021, Guidelines for Site Investigation and Analysis of soils (CLMG No.5).
- MfE 2021, Guidelines for Reporting on Contaminated Sites (CLMG No.1).
- WADOH 2009. Western Australian Department of Health Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated sites in Western Australia.

1.2 Objectives of the Assessment

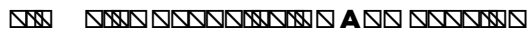
The objective of the DSI is to evaluate if contaminants of concern are present at the site and ultimately assess whether they pose an unacceptable risk to human health or the environment. The report provides an assessment against regulatory compliance and potential surplus soil waste classification.

1.3 DSI Scope of Work

To achieve the above objectives, Davis Ogilvie completed the following scope of work, designed and supervised by a Davis Ogilvie suitably qualified environmental practitioner (SQEP):

- Desk study comprising of communication with ECan to establish if the site was on the LLUR and online database (Landcare Research Limited), available historical aerial photographs, and the Timaru District Council (TDC) property file.
- Site walkover inspection to identify potential visual indicators of ground contamination and observe current site layout and land use.
- Excavation of 19 machine-excavated test pits and the collection of representative soil samples for laboratory analysis in March, April, and May 2025.
- Surficial soil samples collected and sent for laboratory analysis in March, April, and May 2025.
- Visual and / or olfactory assessment of soil samples to characterise soil type and assess for the presence of asbestos and / or significant volatile organic compounds (VOCs) contaminants.

- Scheduling of soil samples for laboratory analysis for contaminants of concern associated with past land use.
- Laboratory analysis of soil samples for potential contaminants of concern including a suite of common heavy metals (As, Cd, Cr, Cu, Pb, Ni, and Zn), PAH, TPH, BTEX, and asbestos.
- Assessment of the significance of soil contaminant concentrations in accordance with the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (herein referred to as the NESCS), MfE Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of Environmental Guideline Values, and BRANZ (2024) New Zealand Guidelines for Assessing and Managing Asbestos in Soil.
- Completion of a conceptual site model and risk assessment for the proposed land use.



2.1 Site Identification

The proposed drain realignment runs approximately 2 km north to south and is located to the northeast of the town of Washdyke. The latest aerial photo of the four investigation areas is provided in **Figure 2**. With **Figure 3** detailing legal identifiers and contaminated land observations from site visits.



Figure 2: Contaminated land investigation areas.



Figure 3: Environmental site plan.

From north to south, the proposed drain realignment borders:

- 101 Aorangi Road (Section 5 Meadows SETT),
- 135 Aorangi Road (Section 17 Meadows SETT),
- 124 Aorangi Road (Lot 2 DP 419868),
- a road (ID: 3557605),
- 116 Aorangi Road (Lot 1 DP 419868),
- Part Section 6 Meadows SETT,
- 144 Meadows Road (Lot 2 DP 548518),
- a road (Lot 3 DP 397304),
- 68 Sheffield Street (Lot 4 DP 365071), and
- 86 Sheffield Street (Lot 2 DP 403105).

2.2 Existing Land-use and Structures

The majority of the land within the site and adjoining is used for industrial / commercial purposes and waste management. The industrial / commercial land in the south of the site and accessed from Sheffield Street includes the Paul Smith Earthmoving yard used for the storage of earth moving vehicles, stockpiles of soil and hardfill, and the storage of associated building and vehicle equipment. Adjacent are several warehouse and workshop buildings with the Bathurst Timaru Coal yard in the south adjoining the site. Vacant land located between the coal yard and the Seadown drain is present to the south of Sheffield Street.

Further to the north is a site belonging to Hilton Haulage and used for warehousing and the storage of fertiliser and other bulk materials. The Hilton Haulage site was undergoing construction at the time of the March 2025 visit with a further warehouse structure being built between the existing warehouse and the sites stormwater ponds. An area of gravel yard to the east of the stormwater ponds has a fenced off area with geotextile cloth attached to the fence. According to Hilton Haulage staff this area is used for the storage of vehicles that have been involved in road traffic accidents and require temporary storage.

Beyond the Hilton Haulage land to the north is the TDC land used for the wastewater plant and treatment ponds at 116 and 122 Aorangi Road. In the path of the proposed re-alignment of the drain on this land there are no significant structures, and the land consists of modified low-lying grassland, wetland, and ponds. A path from this land leads onto Part Section 6 Meadows SETT which continues the land use with the addition of two wastewater ponds which appear to receive wastewater from the By Products Site to the west at 124 Aorangi Road. A single storey small block structure with several posts in a possible yard configuration are located in the northwest of this land adjacent to a drain and Aorangi Road.

The By Products site to the north contains several large metal clad structures and appears to have a coal bunker and boiler on-site together with an above ground storage tank in the yard adjacent to the site.

North of Aorangi Road a gated access and gravel road provides access to the TDC land at 135 Aorangi Road which is leased to the Seadown Shooting Complex for use as a firing range. The complex consists of a single story relocated weatherboard house which is used as the club rooms. Other built features consist of several shipping containers and small wooden structures used for storage or as part of the firing ranges. To the west of the Seadown Shooting complex are three large ponds used in the treatment of wastewater.

Site information is summarised in **Table 1**.

Table 1: Site Details

Address	101 Aorangi Road	135 Aorangi Road	124 Aorangi Road	116 Aorangi Road	-	144 Meadows Road	68 & 70 & 72 Sheffield Street	86 Sheffield Street
Legal Description	Section 5 Meadows SETT	Section 17 Meadows SETT	Lot 2 DP 419868	Lot 1 DP 419868	Part Section 6 Meadows SETT	Lot 2 DP 548518	Lot 4 DP 365071	Lot 2 DP 403105
Property Owners	Timaru District Council	Timaru District Council	Farm Brands NZ Limited Partnership	Timaru District Council	Timaru District Council	Hilton Haulage Limited Partnership	Washdyke Limited Partnership	Paul Smith Earthmoving Limited
Site Area (m ²)	212,600	158,200	186,00	313,400	40,800	98,200	57,800	35,100
Current Land Use	Municipal wastewater ponds and associated infrastructure	Land leased to Seadown Shooting complex for use as a firearms practice ranges	Industrial-Commercial South Canterbury By Products Co Ltd (Animal rendering plant)	Municipal wastewater treatment plant and ponds	Largely vacant with some potential pastoral use. Waste water treatment and disposal from South Canterbury By Products.	Transport depot with commercial warehouse buildings for bulk storage.	Industrial (Engineering Workshop, precast concrete panels at 68 and 70, at 72 Bathurst Timaru Coal Site)	Industrial (Storage of soil and fill stockpiles, construction equipment and vehicle parking)
LLUR HAIL Designations	G6 Wastewater treatment	C2 Gun clubs or rifle ranges	E5 Coal or Coke Yards	A17 Storage tanks or drums for fuel, chemicals or liquid waste. G6 Wastewater treatment	N/A	N/A	72 Sheffield Street only; E5 Coal or Coke Yards	N/A
LLUR Category	Not Investigated	Not Investigated	Not Investigated	Not Investigated	N/A	N/A	Not Investigated	N/A

The site setting is summarised in **Table 2**.

Table 2: Site Setting	
Item	Description
Topography	The site is relatively flat and at a low elevation of approximately 1 – 2 metres above ground level. There are several drains which lead east to the coastline and several stockpiles which locally break the flat topography.
Local Setting	The site is land located to the east of the Washdyke Industrial Zone and to the west of the coastline and South Pacific Ocean. The majority of the land in the vicinity of the site is predominately used for industrial purposes and in particular wastewater treatment, transportation yards, and storage. Additional land uses in the locality include warehouse facilities and their associated infrastructure and a gun club firing range.
Nearest Surface Water & Use	The nearest surface water body to the site is the current location of the Seadown drain which runs parallel to the existing coastline. The drain conveys water from the Seadown plains to the Waitarakao Washdyke Lagoon. Waitarakao Washdyke Lagoon is also located immediately southwest of the drain and is used for recreational, food gathering, cultural purposes and is an important wetland ecosystem.

2.3 Geology and Hydrogeology

The documented geology and hydrogeology of the site and surrounding area is summarised in **Table 3**.

Table 3: Geology and Hydrogeology	
Item	Description
Geology	The GNS geological web map indicates the area is underlain by Late Pleistocene sediments which are described as “ <i>Generally unweathered; variable mixtures of gravel / sand / silt / clay forming extensive terraces or plains.</i> ”
Hydrogeology	Canterbury maps show there are 12 wells within 250 m either side of the proposed stormwater realignment (refer to Table 3). Groundwater is anticipated to be relatively shallow based on the low topography and water levels in the drains.
Groundwater Abstractions	Within 250 m either side of the proposed stormwater realignment there are six registered groundwater takes.
Discharge Consents	There is a single discharge to land consent within 250 m either side of the proposed stormwater realignment: CRC081349. This consent is for the discharge of stormwater from a building and site at 82 Sheffield Street. There are two discharge to air consents within 250 m either side of the proposed stormwater realignment: CRC070698 and CRC170359 but neither have implications for land contamination.

A list of the 12 nearby groundwater wells and their use is listed in **Table 4**. Well and bores within 250 m of the four investigations are detailed within Figure 4 while Figure 5 details active resource consents within 250 m of the investigation areas.

Table 4: Geology and Hydrogeology			
Well ID	Well Status	Recorded Depth (m)	Use
K39 / 0001	Active (exist, present)	12.7	Commercial / industrial
K39 / 0024	Active (exist, present)	10	Irrigation
K39 / 0057	Active (exist, present)	70	Public water supply
K39 / 0112	Not used	10.05	-
K39 / 0114	Not used	20	Geotechnical / geological investigation
K39 / 0257	Active (exist, present)	43	Domestic supply
K39 / 0258	Active (exist, present)	42	Domestic supply
K39 / 0273	Buried / unlikely still exists	2.5	Water level observation
K39 / 0274	Active (exist, present)	2.5	Water level observation
K39 / 0278	Active (exist, present)	2.5	Water level observation
K39 / 0279	Active (exist, present)	2.5	Water level observation
K39 / 0289	No info Expired Bore consent	67	Commercial / industrial

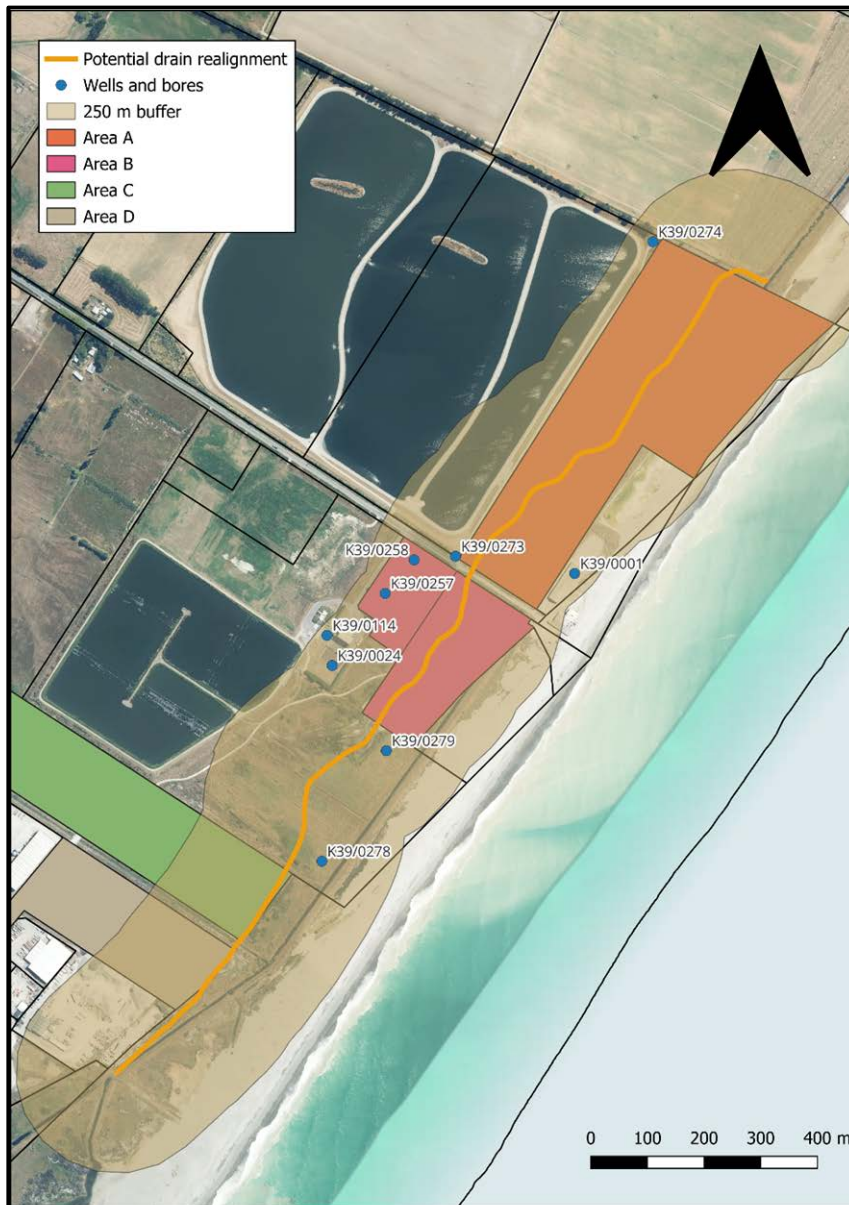


Figure 4: The proposed drain realignment and registered wells within 250 m.

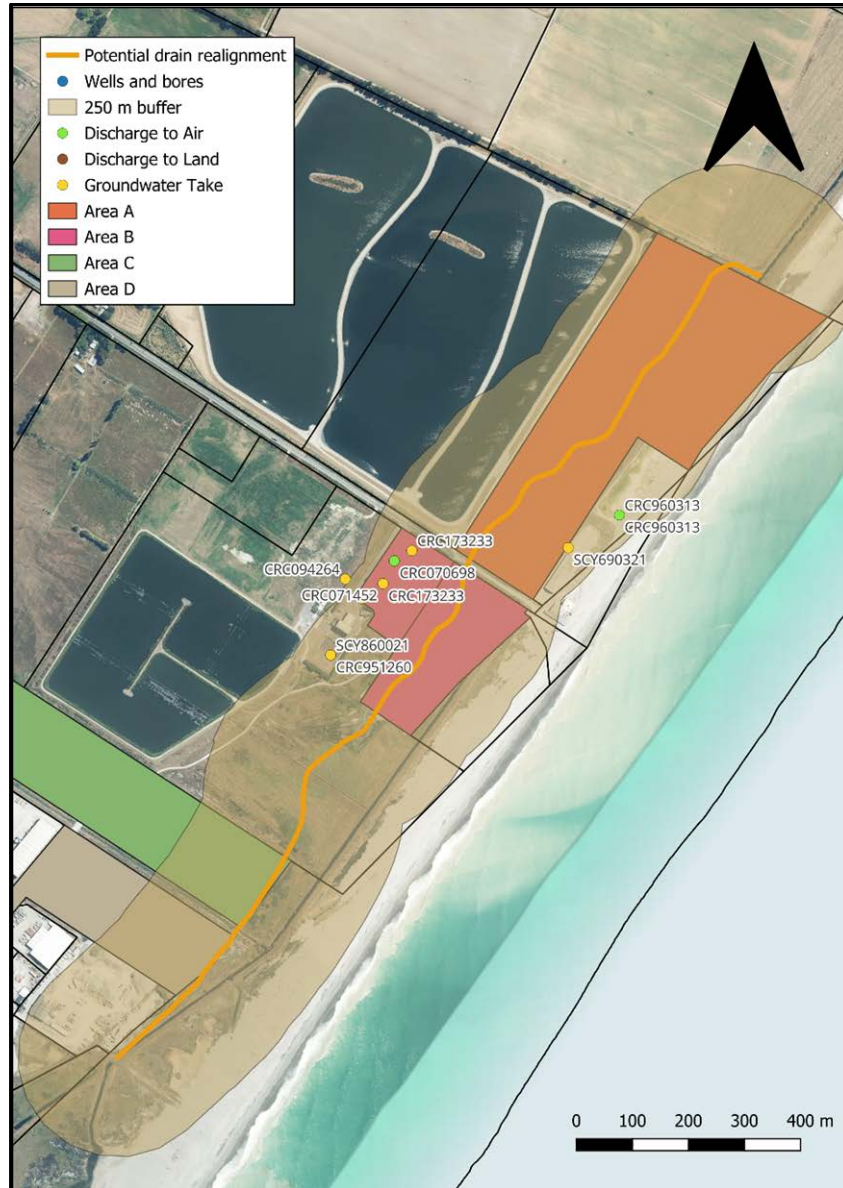


Figure 5: The proposed drain realignment and registered groundwater takes, discharges to land and air within 250 m.

2.4 Ground Water and Surface Water Sensitivity

Groundwater is anticipated to be located at a depth of between approximately 0 – 2 m bgl. A consented groundwater take search indicates there are six registered within 250 m either side of the proposed stormwater realignment.

The site is within the Ōrari Temuka Ōpihi Pareora groundwater zone¹, the boundaries for which are the Pareora catchment and Rangitata River. Consented water takes within this zone are predominantly for irrigation use followed by industrial. Based on the proximity to the coastline, the potential for saline intrusion into aquifers near the ocean is likely.

¹ LAWA (n.d.) Groundwater Zone: Orari-Temuka-Opihi-Pareora. Available at: <https://www.lawa.org.nz/explore-data/canterbury-region/water-quantity/groundwater-zones/orari-temuka-opihi-pareora-groundwater> [Accessed on: 05/05/2025].

An assessment to establish whether the shallow groundwater aquifer below the site is a 'sensitive aquifer' as defined by the Ministry for Environment (MfE) Guidelines (2011) has been undertaken (refer to Table 5 below). It is noted that an aquifer is sensitive when either all the first three criteria set out below are met or the fourth criterion is met in accordance with Module 5.2.3 of the MfE Guidelines.

Table 5: Groundwater and Surface Water Sensitivity	
Criteria	Assessment
The aquifer is not artesian or confined; and	Yes. The site is underlain by an unconfined or semi unconfined aquifer.
The aquifer is expected to be less than 10 m below the potential suspected source of impact; and	Yes. Groundwater is expected to be present at a depth between approximately 0 to 0.5 m bgl.
The aquifer is of quality appropriate for use, can yield water at a useful rate and is in an area where abstraction and use of groundwater may be reasonably foreseen; or	No. The upper groundwater bearing strata is not likely to be of suitable quality or at sufficient yield rates to be viable as a water source for private or public supply.
The source is less than 100 m from a sensitive surface water body (i.e., a surface water body where limited dilution is available to mitigate the impact of contaminated groundwater discharging into the surface water body).	Yes. Surface water receptors have been identified within 100 m of the site.
Sensitivity Assessment	Based on the above, groundwater is considered to be sensitive.

Groundwater is considered to be sensitive in accordance with the MfE sensitive aquifer assessment. Section 15 of the Resource Management Act prohibits the discharge of contaminants to groundwater unless specifically allowed for in a regional plan rule.

2.5 Environment Canterbury Listed Land Use Register

Environment Canterbury (ECan) maintains a LLUR of past and current land uses within the Canterbury region. The LLUR documents sites that have or have had a hazardous activity or land use conducted according to the MfE Hazardous Activities and Industries List (HAIL). Sites that are recorded as currently or previously having had an activity on the HAIL trigger the requirement for a contaminated land investigation prior to development. The LLUR has been populated by ECan primarily from a review of historical aerial photographs and is considered by ECan to not be complete.

The ECan LLUR property statement was requested by Davis Ogilvie on 26 March 2025 which indicates that there are 5 registered HAIL areas associated within 50 m of the site that ECan are aware of. Excerpts are provided in Figures 6 – 9 below with the full statements presented in **Appendix B**.

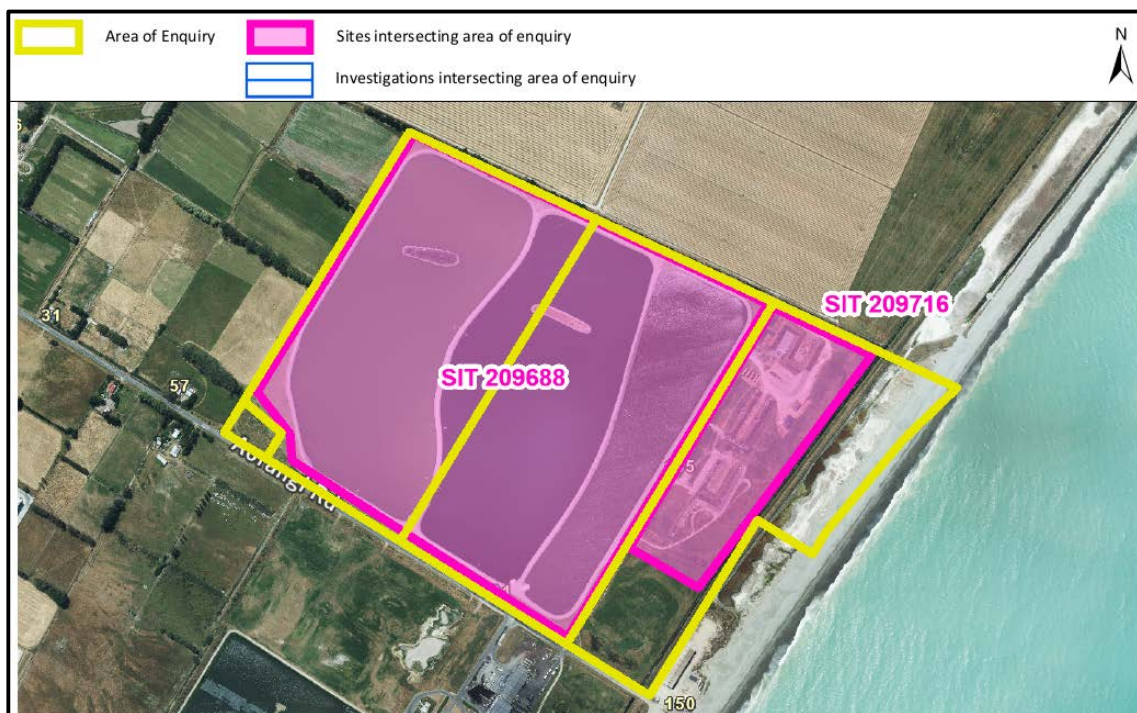


Figure 6: Excerpt from the LLUR property summary report for Section 5 Meadows SETT and Section 17 Meadows SETT.

Site 209688 is registered to Lot 2 DP 39470 which is northwest of Section 5 Meadows SETT and is part of the wastewater treatment plan. This site is registered as a verified HAIL category G6 – Waste recycling or waste or wastewater treatment (not investigated). Site 209716 is registered to Section 17 Meadows SETT with a HAIL category C2 – Gun clubs or rifle ranges (not investigated).

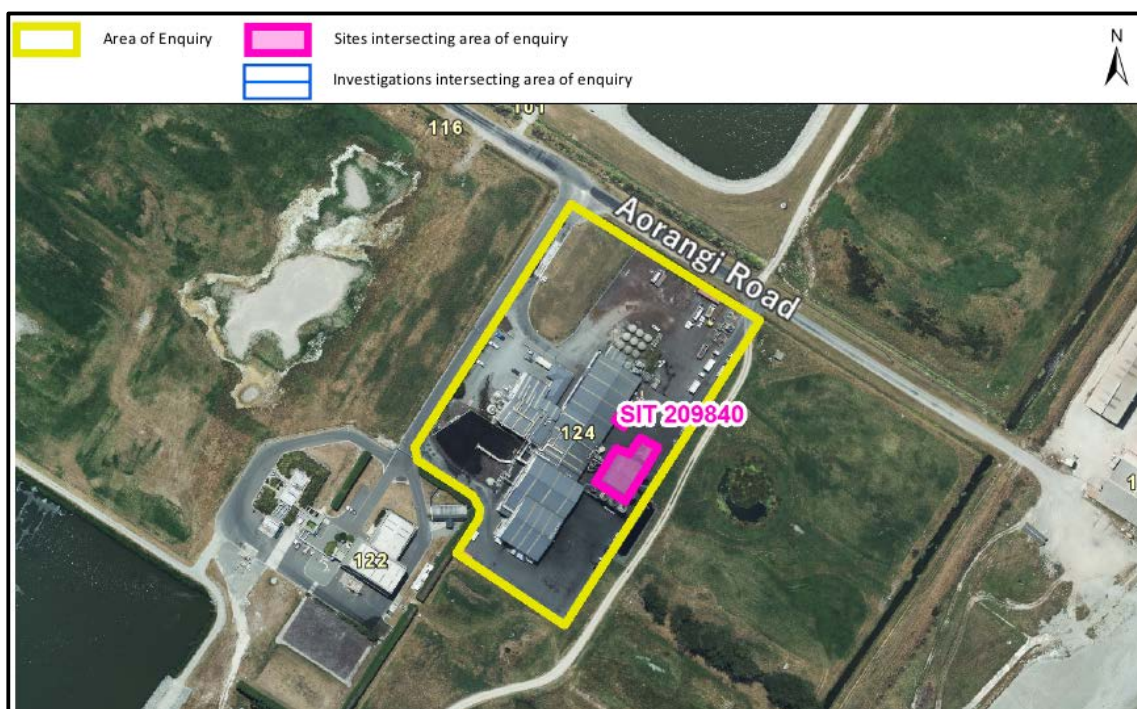


Figure 7: Excerpt from the LLUR property summary report for Lot 2 DP 419868.

Site 209840 for Lot 2 DP 419868 is registered as a verified HAIL category E5 – Coal or coke yards (not investigated).

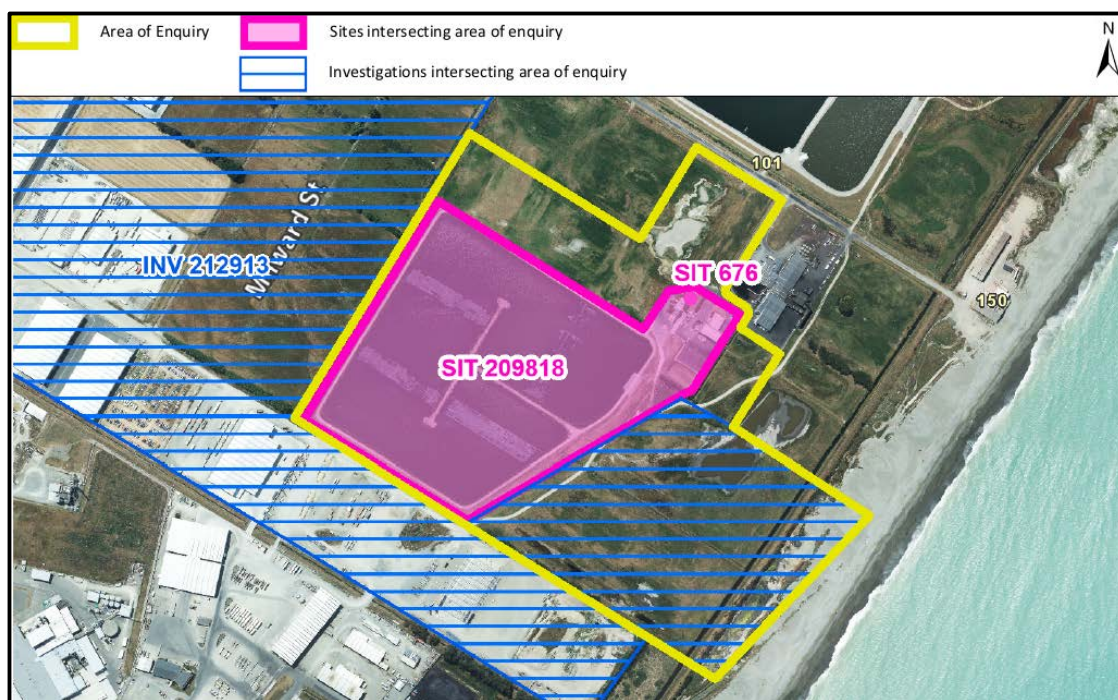


Figure 8: Excerpt from the LLUR property summary report for Lot 1 DP 419868.

Site number 676 is a verified HAIL (not investigated) category A17 – Storage tanks or drums for fuel, chemicals or liquid waste and G6 – Waste recycling or waste or wastewater treatment. Details show that there was one 4,500 L diesel tank installed prior to 1987 that was removed as part of the wastewater treatment plant upgrade in 2018. This tank was replaced with a bundled, above ground diesel storage tank. Site 209818 is a verified HAIL (not investigated) category A17 – Storage tanks or drums for fuel, chemicals or liquid waste and G6 – Waste recycling or waste or wastewater treatment.

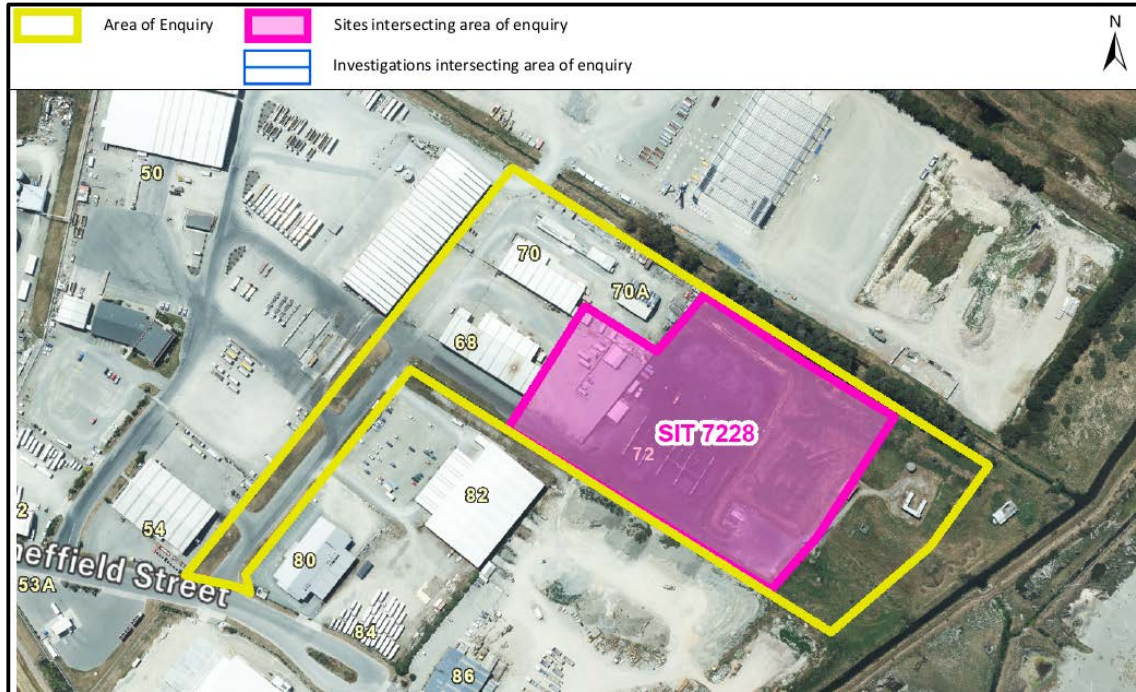


Figure 9: Excerpt from the LLUR property summary report for Lot 4 DP 365071.

Site 7228 is a verified HAIL (not investigated) category E5 – Coal or coke yards. Details state that a coal storage facility was established in 2008.

2.6 Site Interviews / Anecdotal Information

During the site visit on 5 March 2025, Mr James Irvine provided access to the Seadown Shooting Complex and escorted the Davis Ogilvie representative around the site. During the visit Mr Irvine provided information on the sites lease and use over the past 8 – 9 years. He did indicate that for several years he stepped away from the club and was not involved but he is now part of the Complex management and has been involved in its development. Of particular note, Mr Irvine indicated the following:

- The gun range has been recently constructed over the past ten years.
- Bunds created from soil imported into the site from local sites that were being developed between approximately 2010 – 2015. Mr Irvine provided the source of the bunds which is depicted in Figure 10.
- The stormwater drain which captures stormwater runoff is a nova coil subsoil drain which collects stormwater from the front of Range 1 and 2 and conveys this water west then north around the bund.
- The vehicle parking areas and roads appeared to be hard fill and Mr Irvine confirmed that local contractors would provide roading material (excluding coal tar) to the site so they can use it to improve the compaction, drainage, and use of these areas.

- Range 11 is the only range with traps to fire clay targets. The range is used by those with shotguns and the design of the traps, and their flight direction is such that shot should not escape the range.
- Ranges 4, 5, 9, and 10 are rifle ranges and did have some use but this had decreased recently with the police no longer using the facility.
- Ranges 1, 2, and 3 were handgun ranges and were the most well used ranges amongst their membership. Blue plastic 200 L drums have black rubber conveyer belt material or tyres added within the drum to absorb the bullet energy. Some of the ranges contain metallic targets positioned at the end of the ranges.
- A large stockpile of tyres is present in the east of the site adjacent to an access track. The tyres were intended to be used in the facility, but plans have changed.
- Members retrieve the casings from the ground and place these in buckets for recycling.



Figure 10: Source of soil used in construction of earth bunds in Seadown Shooting Complex.

Mr Jim Anderson, the Manager of Property at Hilton Haulage was unable to discuss the site during the site visit on 5 March 2025 but provided additional information via email. Mr Anderson stated the following:

- The fenced off area in the rear of the Hilton Haulage is used for the storage of vehicles that have been involved in crashes and that are required to be stored temporarily while investigations proceed.
- The warehouse building is used for the bulk storage of fertiliser.

2.7 Underground Services

The Canterbury Maps online tool has been reviewed to identify services associated with the site. Services within the site area include those depicted within the below figure (Figure 11).



Figure 11: Stormwater, wastewater, and water supply pipelines within the site of interest.



The history of the site was established via the review of several sources of information. Sources of information included discussions with the current lessee of the Seadown Shooting complex, a review of the TDC property file, records of title, review of available historical aerial photographs from Canterbury Maps, VC Browne², Google Earth, and Retrolens, and a review of consents and groundwater information presented on Canterbury Maps online GIS database. Each source and the relevant information gained is discussed below.

3.1 Records of Title

A review of the titles does not indicate the use of the land for any additional potential HAILs to that what is presented in the LLUR statements.

3.2 Timaru District Property File

The TDC electronic property file was provided to Davis Ogilvie and reviewed by an Environmental Scientist. The property files did not contain pertinent information relevant to additional potential contaminants onsite however it did reveal the following:

116 – 122 Aorangi Road (TDC Wastewater Plant)

- 1986: New building application for housing sewage pumping station and Milliscreening plant.
- 1996: Building consent application for a new eight unit dog pound with workrooms (floor area: 138.175 m²). Code compliance certificate issued April 1996 for works (2.1996.11580.1).
- 2000: Building consent application for a storage container with a proposed use of 'storage – fuel oil and tractor / mower'. Site address listed as Milliscreen Site. Code compliance certificate issued for it in February 2000 (2.2000.25037.1).
- 2000: Building consent application for industrial foul air ventilation system-upgrade at TDC Milliscreen plant (2.2000.27512.1).
- 2006: Milliscreen plant ventilation system-upgrades (2.2006.52568.1).
- 2012: Demolition of dwelling and outbuildings. Notes under year of construction: '1940 (??)' (2.2012.547.1).
- 2014: Commercial and Complex Residential Application for Building Consent (No: 2.2014.1234) to install a sewage pumping station.

² VC Browne & Son (2012) Aerial Photograph Collection New Zealand from the Air 1932 – 1978. Accessed from: <http://www.vcbrowne.com/VCBHome.aspx>

135 Aorangi Road (TDC land leased to Seadown gun range)

- 2016: Residential Application for Building Consent (2.2016.459.1) to relocate existing (1970 – 1980) shed to new site (floor area of 80 m²). April 2018 Application for Code Compliance Certificate stating that clubhouse has been relocated from Pareora Ford Road to Aorangi Road.

86 Sheffield Street (Paul Smith Earthmoving)

- 2008: Office addition and demolition plans (2.2008.62150.1).
- 2012: Office addition (2.2012.1038.1).
- 2022: Office addition (2.2022.927.1).
- 2024: Erect new canopy to north of existing workshop in the southwest of the site (204 m²) (1.2024.26.1).

68 – 72 Sheffield Street (Washdyke Limited Partnership)

- 2010: Erect workshop offices (1.2010.69149.1).
- 2011: Erect workshop (1.2011.71479.1).
- 2012: Extension to the north of existing Pheonix Steel warehouse (2.2010.69150.1).
- Erect workshop (1,203 m²) (2.2011.71480.1)
- 2014: Erect new shed (2.2014.507.1)
- 2015: Erect street sign (2.2015.213.1)
- 2016: Erect relocatable dwelling (127.5 m²) (2.2016.42.1)
- 2017: New storage shed (389.7 m²) (2.2017.1029.1)
- 2020: Erect garage (2.2020.670.1)
- 2021: Erect TPT storage garage (2.2021.715.1)
- 2022: New building (2.2022.665.1)
- 2024: New building (2.2024.307.1)
- 2025: Install waste oil heater (2.2025.79.1)

From our desktop review it appears the site has been subject to typical agricultural land use activities until the early-2000s when industrial land development on and adjacent to the site commenced. More recently from 2016 onwards the Seadown Shooting Complex has commenced the construction of firing ranges through the deposition and shaping of soil to create bunds.

3.3 Fire and Emergency New Zealand

A request for information was sent to Fire and Emergency New Zealand on 2 May 2025 by an Environmental Scientist. A reply dated 9 April 2025 details a search of the last twenty years having found seven recorded incidents dating from 2006 to 2020. Details are contained in the below table.

Table 6: Official Information Act Request Fire and Emergency New Zealand Details

Legal Description	Address	Date	Incident Type
Lot 2 DP 403105	86 Sheffield Street	21-Sep-2006	Outside rubbish fire
Lot 2 DP 403105	86 Sheffield Street	16-Jan-2009	Outside rubbish fire
Lot 2 DP 419868	124 Aorangi Road	16-Feb-2011	Structure fire with damage
Lot 4 DP 365071	68 & 70 & 72 Sheffield Street	6-Jun-2015	Structure fire with no damage
Lot 2 DP 419868	124 Aorangi Road	6-Nov-2017	Outside rubbish bin, skip fire
Lot 4 DP 365071	68 & 70 & 72 Sheffield Street	13-Aug-2016	Major Hazardous Substance Incident
Lot 2 DP 419868	124 Aorangi Road	6-Jul-2020	Outside rubbish bin, skip fire

Additional detailed pertaining to the 13 August 2016 Hazardous Substance Incident in the form of a SMS Incident Report (SMS Report) have been reviewed. Details include an approximate 1,000 L inorganic acid (nitric acid and phosphoric acid) spill into bunded area from which some may have leaked into waterway due to an installation deficiency. Copies of the details can be found within **Appendix C**.

3.4 Historical Aerial Photograph Review

Aerial photographs obtained from the Google Earth, VC Browne, and Canterbury Maps dating from 1952 to 2023 have been reviewed to identify potential sources of land contamination. The relevant visible features are summarised in **Table 7** while the photographs available are presented in **Appendix D**. Figure 12 taken in 1964 shows the visible parts of the site in use for agricultural purposes.



Figure 12: View east towards Washdyke Lagoon in 1964 (source: VC Browne).

Table 7: Historical Aerial Photographs

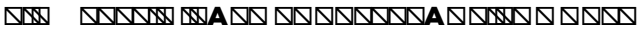
Date & Source	Description
1952 (CRC)	The site is undeveloped with large agricultural paddocks present across all. No built structures present with the exception of a potential aerial mast present in TDC Part Section 6 Meadows SETT land. Sheep and cattle visible on farmland in area.
1969 (CRC)	The site is undeveloped with large agricultural paddocks present across all. Only a single built structure is visible, a small building south of Aorangi Road which appears to be in the same location as a concrete block building present in 2025.
1973 (CRC)	No significant changes.
1977 (CRC)	Small structure on TDC Part Section 6 Meadows SETT land.
1987 (CRC)	Photo of low resolution. Land use appears as previous.
1996 (CRC)	No significant changes. Some isolated non-uniform soil disturbance at 122 and 124 Aorangi Road is visible.
2005 (CRC)	The majority of the land appears to be in use for agricultural land, with no significant built features present. The properties at the end of Sheffield St appear to be under construction with earthworks visible in 82 & 86 Sheffield.
2012 (CRC)	At 72 Sheffield Rd to the southeast of the coal yard are several structures, a building with a red roof adjacent to a gravel track and a 'u' shaped building further east. Several other smaller features including three scrap cars. Earthworks on the wastewater treatment plant and wastewater ponds together with the land today used for the firing ranges are visible. The Hilton Haulage site at 144 Aorangi shows some evidence of small scale earthworks traversing it but overall the land appears to be farmland. The land use at 86 Sheffield appears to be a contractors yard, however the soil stockpiles appear to be spilling over the property line. The material appears to soil with several stockpiles of rock boulders. The TDC Part Section 6 Meadows SETT land contains the lined wastewater pond from the by products facility, adjacent pond and an overflow discharge point and channel are visible. The grass surrounding the pond is brown indicating the wastewater pH or temperature may be detrimental to plant growth or that a herbicide has been applied.

2015 (CRC)	A structure resembling a residential house is present within reserve land to the southeast of 72 Sheffield Road. Other materials, possibly scaffolding or other metallic objects are present surrounding the buildings. Construction at the Hilton Haulage 144 Meadows Road facility is ongoing with the stormwater ponds yet to be constructed. In addition, a segregated area of approximately 10metres by 50metres is fenced off in the south of the site, close to the southern boundary. The fenced off area is on a gravel part of the yard and appears to contain four badly damaged cars and a truck.
2020 (CRC)	A structure resembling a residential house is still present within reserve land to the south east of 72 Sheffield Road. Additional material from the Paul Smith Yard at 86 Sheffield Street appears to have spilled or have been placed over the boundary including several large tyres, timber posts and large metal pilling equipment. This is in addition to the rocks and soil previously present. Further construction at the Hilton Haulage 144 Meadows Road facility is ongoing with the stormwater ponds yet to be constructed. In addition, a segregated area of approximately 10metres by 50metres is fenced off. Range 2 and 4 appear to have been constructed with bunds present and range 2 appears to be in use. A stormwater drain from Range 2 and range 4 appear to be present and convey water north to the sit boundary and drain beyond. The bunds around the other ranges appear to be at various stages of construction and don't appear to be in use. A pile of stockpiled tyres is visible to the east of the ranges. There are four piles of blue 200l drums are present in the west and east of the site in the north.

3.5 Previous Environmental Reports

Following a review of the LLUR for previous environmental investigations within the site area, HAIL Assessment undertaken by Davis Ogilvie (2018) for the Washdyke Industrial Expansion Zone was identified and reviewed by an Environmental Scientist and is summarised below:

- The assessment was undertaken to support an application for stormwater discharge consent within the Washdyke Industrial Expansion Zone (WIEZ).
- The assessment covered the southern half of this subject site and did not extend north beyond the wastewater treatment plant. Much of the Davis Ogilvie (2018) HAIL Assessment was completed for land not included in this site.
- Several existing activities were excluded from the assessment as they were established as being 'out of phase' ahead of the planned subdivision.
- One HAIL activity was identified at Section 8 Meadows Settlement (G4 – Scrap yards including automotive dismantling, wrecking or scrap metal yards) related to the storage of the scrap vehicles. This parcel is located to the west wastewater treatment plant and west of this subject site and is therefore not applicable to land contamination potential at this site.
- The updated aerial image (Figure 2) in the Davis Ogilvie (2018) report does show that Hilton Haulage yard appears to be under construction, while the coal yard at 72 Sheffield Street is present as is some other built structures to the east. Earthworks are apparent at the gun club and the formation of some of the bunds appears to be taking place at this time. The image appears to be that taken in October 2015 and is present in the Google Earth images reviewed.



A preliminary conceptual site model has been developed and consists of four primary components. For a contaminant to present a risk to human health or the environment, all four components are required to be present and connected. For the potential risk to be determined each component is required to be assessed. The four components of a conceptual site model are:

- Source of contamination.
- Pathway to allow the contamination to mobilise.
- An exposure pathway (ingestion, inhalation).
- Sensitive receptors which may be impacted by the contamination.

Overall, the site visit did identify additional land uses that were considered to meet the definition of a HAIL or required further assessment to confirm. In summary these additional activities do not present on the LLUR are presented in **Table 8** and Figure 13.

Table 8: Additional HAIL Categories Identified			
Location		Land Use	Potential HAIL Category
Area C	144 Meadows Road, Hilton Haulage Site	Damaged vehicle storage Burn Pit	G5; Waste disposal to land
Area B	Part Section 6 Meadows SETT	Waste water ponds	G6; Waste recycling or waste or wastewater treatment
Area D	72 Sheffield Street	Stockpiles (concrete and timber)	G5; Waste disposal to land
Area A	135 Aorangi Road (Seadown Shooting Complex)	Tyre stockpile	G5; Waste disposal to land

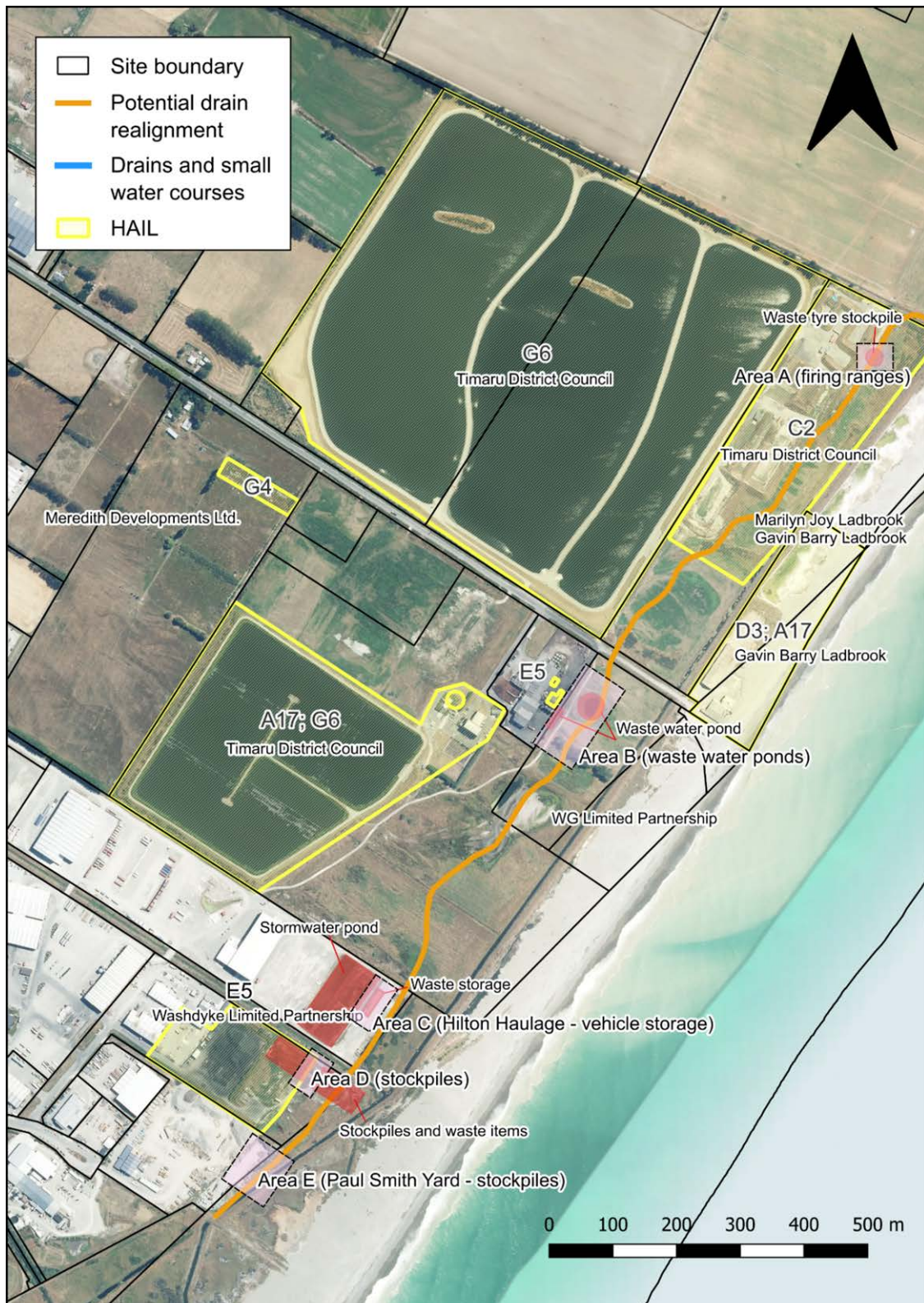


Figure 13: Potential HAIL areas within proposed drain alignment.

The potential source, pathway and receptor linkages at this subject site are summarised below in **Table 9**.

Table 9: Preliminary Conceptual Site Model

Legal Description	Address	Potential Sources	HAIL ID	Contaminants of Concern	Investigation location
Section 5 Meadows SETT	101 Aorangi Road	Wastewater Treatment Plant	G6; Wastewater treatment	Depends on type of waste – biological hazards, metals, PAHs, semi-volatile organic compounds, and solvents	No intrusive investigation undertaken
Section 17 Meadows SETT	135 Aorangi Road	Clay targets	C2; Gun clubs or rifle ranges	Metals (lead, antimony, arsenic, copper, zinc, tin, and nickel)	The location(s) and areas(s) where bullets may fall or become lodged. The location(s) and areas(s) where shot may fall on land. Range 11 is the only range with traps to fire clay targets
		Tyre stockpile	G5; Waste disposal to land	Zinc	Five shallow soil samples SS01 – SS05
Lot 2 DP 419868	124 Aorangi Road	Storage of coal and/or coal products	E5; Coal or Coke Yards	Hydrocarbons (particularly PAHs), boron, and arsenic	Adjacent to southern boundary of site
Lot 1 DP 419868	116 Aorangi Road	Above ground diesel storage tank	A17; Storage tanks or drums for fuel, chemicals or liquid waste.	Hydrocarbons including BTEX, PAHs, and solvents; lead and other metals, particularly if waste oil handled	No intrusive investigation undertaken
		Wastewater Treatment Plant	G6; Waste recycling or waste or wastewater treatment	Depends on type of waste – biological hazards, metals, PAHs, semi-volatile organic compounds, and solvents	No intrusive investigation undertaken
Part Section 6 Meadows SETT		Waste water ponds	G6; Waste recycling or waste or wastewater treatment	Depends on type of waste – biological hazards, metals, PAHs, semi-volatile organic compounds, and solvents	No intrusive investigation undertaken
Lot 2 DP 548518	144 Meadows Road	Damaged vehicle storage	G5; Waste disposal to land	Metals, petroleum hydrocarbons (particularly lube oils),	Vehicle storage area in southeast of site
		Burn Pit		PAHs, metals	No intrusive investigation undertaken
Lot 4 DP 365071	68 & 70 & 72 Sheffield Street	Coal storage facility	E5; Coal or Coke Yards (72 Sheffield Street only)	Hydrocarbons (particularly PAHs), boron, and arsenic	No intrusive investigation undertaken
		Stockpiles (concrete and treated timber)	G5; Waste disposal to land (72 Sheffield Street only)	Treated timber: copper, arsenic, chromium,	Stockpiles in southeast of site

4.1 Sampling Objectives

The objective of the DSI sampling scope of work was to collect representative soil samples from targeted locations at the site suitable for submission for laboratory analysis to allow the concentration of potential contaminants of concern to be assessed.

4.2 Contaminants of Potential Concern

Soil sampling and analysis was completed to evaluate for the presence of potential contaminants of concern: heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc), Polycyclic Aromatic Hydrocarbon (PAH), and Total Petroleum Hydrocarbons (TPH).




















The intrusive investigations were undertaken by Davis Ogilvie on 5 March and 16 April 2025. A total of 19 excavator-dug locations were advanced to a depth of approximately 2 m bgl. The locations were all selected to target the potential HAIL areas.

5.1 Methodology

The following investigation assessment methodology was undertaken:

- Site walkover to assess the preliminary conceptual site model and identify potential HAIL on site.
- Soil samples were collected based on visual and olfactory evidence of contamination, soil type, depth, and location with their location presented in **Figures 14-16**.
- Visual and olfactory inspection of each sample for indicators of contamination was completed by an experienced environmental scientist.
- Soil samples were collected at various depths between the ground surface and the base of the test pits which were all terminated in at maximum depth of 2 m bgl.
- In accordance with our health and safety plans all soil samples were collected directly from the excavator bucket or from side wall of shallow test pits.
- Each soil sample was given a unique identification number, which consisted of a site, sample location and depth identifier (e.g., TP23_SS01@0.3). In addition, the sample date was also included.
- All samples were placed in 250 mL glass jars supplied by Hill Laboratories, which were then closed, labelled, and placed in chilled containers prior to transportation to the laboratory. Samples were transported to Hill Laboratories under the standard chain of custody documentation provided in **Appendix E**.
- Hill Laboratories is an International Accredited Laboratory which was engaged to conduct all laboratory analysis excluding asbestos analysis. To maintain their International Accreditation, Hill Laboratories undertakes rigorous cross checking and routine duplicate sampling testing to ensure the accuracy of their results.

- All soil samples were screened with a Field Portable X-ray Fluorescence Spectrometer (XRF). The XRF used was an Olympus Vanta C-Series VCW Model. The manufacturer's instructions were followed in the use of the device. Manufacturer supplied calibration samples were tested frequently in the field.
- To reduce the potential for cross contamination, each sample was collected using disposable nitrile gloves that were discarded following the collection of each sample.
- After collection of each sample, the sampling equipment was decontaminated by scrubbing with a solution of Decon 90 and rinsing with tap water followed by deionised water.
- The sampling was completed in accordance with Davis Ogilvie standard operating procedures while geological logging was completed in general accordance with the New Zealand Geotechnical Society Inc. 'Guideline for the Field Classification of Soil and Rock for Engineering Purposes' (December 2005).
- All field work and sampling were undertaken in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils (2021).
- Following receipt of the samples by Hill Laboratories, the soil samples were scheduled for a selection of analytes (heavy metals and asbestos).
- Assessment of soil concentrations for contaminants of concern against applicable standards and soil acceptance criteria for the protection of human health and the environment.

5.2 Area A – Seadown Shooting Complex

Initial soil samples (seven in total) from the complex were collected during the site visit (5 March 2025) to be able to corroborate information provided by the site management and provide an evaluation on the likelihood of lead contamination in the potential proposed route of the Seadown Drain. No other potential HAIL sites were assessed as an alternative investigation methodology would be required (test pitting). Additional site investigation via test pitting and soil sampling was carried out on 16 April 2025 with an additional 31 soil samples collected from Area A. Additional soil sampling was conducted on 16 July 2025 with an additional five soil samples collected from within and around the tyre stockpile relatively central in the north of the site.

5.2.1 Site Specific Methodology

- **Targeted Sampling:** Locations for soil sampling were determined based on access to the gun ranges and based on discussions with the Seadown Complex representative. Locations were chosen to assess the likely source and distribution of bullet contamination within the bunds and floors of some of the more heavily used ranges. Soil sample locations are shown in Figure 14. Samples from the bunds more likely to be relocated based on the proposed re-alignment were also targeted.

Samples for the tyre stockpile were gathered from the accessible areas within the stockpile as well as from its surrounding sides.

- **Sample depth:** Samples from the bund were typically collected from the bund surface down to a depth of approximately 0.5 m bgl. Samples on the range floor were collected from the surface and beneath the imported gravel chip. A single sample was collected from the base of the drain adjacent to Range 1. Samples from around and within the tyre stockpile were taken from a depth of approximately 0.25 m bgl.

5.2.2 Sample Analysis

Following receipt and registration of the soil samples at Hill Labs, the following analysis was scheduled:

- Seven samples collected on 5 March 2025 were selected for heavy metals analysis (arsenic, cadmium, chromium, copper, lead, nickel, and zinc).
- SPLP for heavy metals was performed on one of the samples collected (R2_7m_0.05). This sample was selected for SPLP analysis as the soil sample contained elevated heavy metals and the soil was located relatively close to the proposed drain alignment.
- 13 of the total 31 collected soil samples (16 April 2025) were selected for analysis for heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc).
- Five of the total five soil samples collected on 16 July 2025 were scheduled for heavy metal (arsenic, cadmium, chromium, copper, lead, nickel, and zinc), three were scheduled for TPH, and three were scheduled for PAH analysis.



Figure 14: Area A – Seadown Shooting Complex soil sample location plan.

5.3 Area B – Farm Brands NZ Limited Partnership

Soil sampling was undertaken during the site visit on 16 April 2025 with a total of eight samples collected from Area B.

5.3.1 Site Specific Methodology

- **Targeted sampling:** Locations for soil sampling were determined based on access to the site, presence of underground services and location of wastewater treatment ponds. Soil sample locations are shown in Figure 15.
- **Sample depth:** Samples were collected from a depth of 0.1 – 0.3 m begl.

5.3.2 Sample Analysis

Following receipt and registration of the soil samples at Hill Labs, the following analysis was scheduled:

- Two of the total eight collected soil samples were selected for analysis for heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc) and PAH.
- One of the total eight samples was scheduled for TPH analysis.



Figure 15: Area B – Farm Brands NZ Limited Partnership soil sample location plan.

5.4 Area C – Hilton Haulage Limited Partnership

Soil sampling at Lot 2 DP 548518 consisted of a total of 11 soil samples collected during a site visit on 16 April 2025.

5.4.1 Site Specific Methodology

- **Targeted sampling:** locations for soil sampling were determined from observed waste storage area in the southeast of the site. Soil sample locations are shown in Figure 16.

- **Sample depth:** Based on the above ground source, soil samples from Area B were predominately collected from a depth of 0.1 – 0.3 m bgl.

5.4.2 Sample Analysis

Following receipt and registration of the soil samples at Hill Labs, the following analysis was scheduled:

- Three of the total 11 collected soil samples were selected for analysis for heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc) TPH, and PAH.
- One of the samples was scheduled for BTEX analysis.

5.5 Area D – Washdyke Limited Partnership

A total of eight soil samples were collected during the site visit on 16 April 2025.

5.5.1 Site Specific Methodology

- Targeted sampling: locations for soil sampling were determined from observed waste items and stockpiles in the southeast of the site. Soil sample locations are shown in Figure 16.
- Sample depth: soil samples were collected from a depth of 0.1 – 0.5 m bgl.

5.5.2 Sample Analysis

Following receipt and registration of the soil samples at Hill Labs, the following analysis was scheduled:

- Four of the total eight collected soil samples were selected for analysis for heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc).
- Two of the samples were scheduled for presence / absence asbestos analysis.



Figure 16: Area C and D Soil sample location plan

5.6 Quality Assurance and Quality Control

The laboratory data has been considered sufficient to be relied upon for this assessment based on the following QA / QC procedures:

- **Soil Sampling and Handling:** Each soil sample was collected, labelled, and handled according to the established Davis Ogilvie procedures for soil sampling and handling.
- **Laboratory Analysis:** All soil samples were submitted to Hill Labs Limited, a recognized laboratory accredited by International Accreditation New Zealand (IANZ), the New Zealand representative in the International Laboratory Accreditation Cooperation (ILAC). The tests were performed in accordance with Hill Labs' accreditation, and no data errors were reported.

- **Quality Assurance:** All fieldwork was managed by a Suitably Qualified and Experienced Practitioner (SQEP), and a SQEP reviewed this report, fulfilling the requirements of the National Environmental Standard for Soil Contamination (NESCS).

5.7 XRF Analysis

The Ministry for the Environment (MfE)³ published guidance to help practitioners use XRF as a field technique.

A handheld XRF was utilised during the assessment to provide additional contaminant data and supplement laboratory data. The accuracy of the XRF is estimated by comparing field XRF measurements to laboratory analyses for the same samples.

During the assessment, for QA/QC reasons the XRF was used to screen known concentrations of a standard (NIST 2711a) and the difference evaluated. Using the target coefficient of variation of less than 30 %, the majority of QA/QC tests performed showed good correlation with the standards (see **Table 10** below). The XRF data is therefore considered suitable to rely upon and draw conclusions from.

Table 10: XRF Compared to Standard (NIST 2711a)

Date	ID	Arsenic (ppm)	Copper (ppm)	Lead (ppm)	Nickel (ppm)	Zinc (ppm)
16-Apr-2025	Test	95	121	1314	24	346
	NIST 2711a	107 ± 5	140 ± 2	1,400 ± 10	21.7 ± 0.7	414 ± 11
	RPD	11.88	14.56	6.34	10.07	17.89
	Test	104	122	1,299	20	349
	NIST 2711a	107 ± 5	140 ± 2	1,400 ± 10	21.7 ± 0.7	414 ± 11
	RPD	2.84	13.74	7.48	8.15	17.04
	Test	98	119	1,306	23	348
	NIST 2711a	107 ± 5	140 ± 2	1,400 ± 10	21.7 ± 0.7	414 ± 11
	RPD	8.78	16.22	6.95	5.82	17.32
13/05/2025	Test	103	112	1275	30	339
	NIST 2711a	107 ± 5	140 ± 2	1,400 ± 10	21.7 ± 0.7	414 ± 11
	RPD	3.81	22.22	9.35	32.11	19.92
	Test	102	120	1285	25	345
	NIST 2711a	107 ± 5	140 ± 2	1,400 ± 10	21.7 ± 0.7	414 ± 11

³ Ministry for the Environment (2024) Field use of X-ray fluorescence spectroscopy for investigation of contaminated soils.

	RPD	4.78	15.38	8.57	14.13	18.18
Note RPD – Relative Percentage Difference Highlighted Red denotes exceedance of 30 % criteria						

6.1 Summary of Field Observations

During the site visit on 5 March, 16 April, and 8 May 2025 we made the following observations summarised below. Site photographs are contained in **Appendix A**.

6.1.1 Site visit – 5 March 2025

Area A – Seadown Shooting Complex – 135 Aorangi Road

- The residential house relocated to the site was on piles and appeared to be a relatively good condition painted weatherboard construction with metal roof. No suspected asbestos containing material was observed on the structure.
- The range floors 1, 2, and 3 consisted of an imported angular 20 mm chip overlying a silty soil. The earth bunds appeared well vegetated.
- Range 2 and 3 appeared to be heavily used with numerous holes in the drum targets.

Area B – 124 Aorangi Road & Part Section 6 Meadows SETT (By Products Limited and adjacent TDC Land)

- A fenced off and lined rectangular pond was present in Part Section 6 Meadows land. The pond appeared to be receiving wastewater (dark grey/brown with slight sheen) from the adjoining By Products site. A pipe in the northeast of the pond appeared to be conveying water from that pond into a circular unfenced pond approximately 20 m east.
- The water in the unfenced pond appeared to have significant weed growth although no odour was present from this pond.

Area C – 144 Meadows Road (Hilton Haulage Site)

- The rear (south) of the Hilton Haulage yard is unsealed with a gravel compact surface present across the majority.
- A fenced off area (approximately 10 m by 40 m) with a geotextile wrap on the fence was in the northeast of the yard. The ground surface inside this fenced off area and adjacent outside of this area had observable signs of oil/fuel staining. The hydrocarbon staining appeared relatively isolated and patchy and restricted to this area. No vehicles were present in the area, but the stains and other metallic debris appeared to be consistent with a damaged vehicle source.

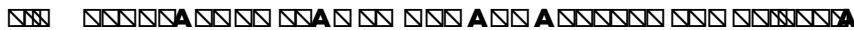
- A small burn pile was in the northeast of this yard area. Pallets and other untreated timber were present on the fire. A number of nails and other metal fasteners were in the ashes.
- A small open drain/swale runs southwest along the yard's eastern boundary.

Area D – 68 – 72 Sheffield Street (Washdyke Limited Partnership)

- Several large stockpiles were present orientated northwest to southeast running along the boundary of the site and the drain. The stockpiles were approximately 3 – 4 m tall and were overgrown. Large pieces of concrete and some treated timber poles were present in one of the stockpiles.
- A small stockpile of miscellaneous waste items was present between the site's southern boundary and the drain.
- An area of compacted gravel was evident in the centre of the southern half of 72 Sheffield Street.

86 Sheffield Street (Paul Smith Earthmoving)

- The yard appeared to have been recently altered with a new southern boundary fence constructed and some earthworks on the drain side completed.
- Large stockpiles were present in the yard consisting of soil and a separate hardfill stockpile.



The soil concentrations have been compared to the assessment criteria described in this section. This assessment was completed based on the scope and our clients proposed project goals.

7.1 Background Concentrations

The NES Regulations under 5(9) do not apply to a piece of land where a detailed site investigation exists that demonstrates that any contaminants in or on the piece of land are at, or below, background concentrations.

Where contaminants are identified above background, an NES resource consent may be required where the volume of soil to be disturbed or disposed of within the area of the site containing elevated concentrations exceeds the permitted volumes.

The site is mapped on Canterbury Maps as being situated within the regional, Gley soil group. Cleanfill sites also often use background concentrations relative to their location, to determine waste acceptance criteria.

Table 11: Adopted Heavy Metal Background Concentrations

Element	Maximum concentration Canterbury Regional Background (Gley) (mg/kg) ⁴	Canterbury Regional Background (Recent) (Cleanfill Waste Acceptance Criteria) ⁵
Arsenic	11	12.58
Cadmium	0.28	0.19
Chromium	19.3	22.7
Copper	16.43	20.3
Lead	19.3	40.96
Nickel	16.1	20.7
Zinc	77.1	93.94

For the purposes of providing an indicative assessment, published background concentrations in Christchurch urban soils have been referenced for PAH values. These values have been sourced from Environment Canterbury (2007), *“Background concentrations of polycyclic aromatic hydrocarbons in Christchurch urban soils.”*

Table 12: Adopted Polycyclic Aromatic Hydrocarbon Background Concentrations

Element	Background PAH Christchurch Urban (mg/kg) ⁶
B (a) P PEF (NZ NES)	0.922
Acenaphthene	0.055
Acenaphthylene	0.069
Anthracene	0.113
Benzo (a) anthracene	0.47
Benzo (a) pyrene	0.595
Benzo (g,h,i) perylene	0.459
Benzo (k) fluoranthene	0.296
Chrysene	0.539
Dibenz (a,h) anthracene	0.112
Fluoranthene	1.345
Fluorene	0.06
Indeno (1,2,3-c,d) pyrene	0.385
Naphthalene	0.029
Phenanthrene	0.703
Pyrene	1.362

⁴ Manaaki Whenua Landcare Research (2023) Determining background soil concentrations of trace elements across New Zealand.

⁵ Tonkin and Taylor Ltd (2006) *Background concentrations of selected trace elements in Canterbury Soils*. Report No. R07/1.

⁶ Environment Canterbury (2007) Background concentrations of polycyclic aromatic hydrocarbons in Christchurch urban soils.

7.2 Canterbury Land and Water Regional Plan

7.2.1 Groundwater

The Canterbury Land and Water Regional Plan (LWRP) Rule 5.187, the passive discharge of contaminants from contaminated land onto or into land in circumstances where those contaminants may enter water is a permitted activity, provided the following conditions are met:

1. *There has been a site investigation report provided to ECan in accordance with Rule 5.185;*
2. *Either the site investigation report or water quality sampling demonstrates that the discharge does not result in the concentration of contaminants in groundwater:*
 - a. *At the property boundary;*
 - b. *At any existing groundwater bore (excluding any monitoring bore located on the property);*
 - c. *Within a Community Drinking-water Protection Zone; exceeding the limits applicable to groundwater set out in Schedule 8; and*
3. *Either the site investigation report or water quality sampling demonstrates that the discharge does not result in the concentration of contaminants in groundwater at any point where groundwater exits to surface water, exceeding the receiving water quality standards in Schedule 5 for 90% of species; and*
4. *At any point where the groundwater exits to surface water the discharge does not produce any:*
 - a. *Conspicuous oil or grease films, scums or foams, or floatable or suspended materials; or*
 - b. *Conspicuous change in the colour or visual clarity.*

7.2.2 Construction Phase Stormwater & Risks to Surface Water Receptors

Under the Canterbury Land and Water Regional Plan (LWRP) Rule 5.94A, the discharge of construction-phase stormwater, other than into or from a reticulated stormwater system to a surface waterbody, or onto or into land in circumstances where a contaminant may enter groundwater or surface water, is a permitted activity, provided the following conditions are met:

1. *The area of disturbed land from which the discharge is generated is less than:*
 - a. *1,000 m² for any construction-phase stormwater generated as a result of work carried out in an area shown as High Soil Erosion Risk on the Planning Maps;*
or
 - b. *two hectares in any other location; and*

2. *The concentration of total suspended solids in the discharge shall not exceed:*
 - a. *50 g/m³ where the discharge is to any spring-fed river, Banks Peninsula River, or to a lake except when the background total suspended solids in the waterbody is greater than 50 g/m³ in which case the Schedule 5 visual clarity standards shall apply; or*
 - b. *100 g/m³ where the discharge is to any other river or to an artificial watercourse except when the background total suspended solids in the waterbody is greater than 100 g/m³ in which case Schedule 5 visual clarity standards shall apply, and;*
3. *The discharge does not result in an increase in the flow in the receiving waterbody at the point of discharge of more than 1% of a flood event with an Annual Exceedance Probability of 20% (one in five-year event); and*
4. *The discharge is not from, into or onto contaminated or potentially contaminated land; and*
5. *The discharge does not contain any hazardous substance; and*
6. *The discharge does not occur within a Community Drinking-water Protection Zone as set out in Schedule 1.*

ECan often determine if a site is a contaminated site and potential risk to surface water quality by comparing the soil concentrations at a site with the Australian & New Zealand Guidelines for Fresh & Marine Water Quality (ANZGWQ) upper guideline values (GV-high) for toxicants in sediment multiplied by three (to account for the separation between site soil and sediment).

7.3 Disposal Criteria

The results of the analysis were also compared to MfE Hazardous Waste Guidelines for 'Class A' and 'Class B' Landfills. This was undertaken to provide a preliminary assessment of the possible soil disposal options should the need for soil to be removed during the work arise.

Dependent on the contamination conditions of the spoil, off-site disposal options range from disposal to "cleanfill" sites to managed fill.

7.4 Human Health Assessment Criteria

7.4.1 NESCS

The NES for Assessing and Managing Contaminants in Soil to Protect Human Health Regulations under the Resource Management Act (1991) came into effect on 1 January 2012.

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

The NESCS land use scenario adopted in this assessment is 'Commercial / Industrial outdoor worker (unpaved)'.

The NESCS do not consider environmental receptors; accordingly, the application of guidelines relevant to environmental receptors shall be implemented according to the MfE Contaminated Land Management Guideline No.2 and any relevant rules in Regional Plans.

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

According to the NES regulations (8.3), disturbing the soil of the piece of land is a permitted activity while the following requirements are met:

- (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:*
- (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:*
- (c) *the volume of the disturbance of the soil of the piece of land must be no more than 25 m³ per 500 m²:*
- (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 m³ per 500 m² of soil may be taken away per year:*
- (e) *soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind:*
- (f) *the duration of the activity must be no longer than 2 months:*
- (g) *the integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.*

A summary of the soil disturbance volumes anticipated for the earthworks is provided in **Table 13.**

Table 13: Comparison of Proposed Earthwork Volumes NES

Area	NES Regulation			Site Area	Permitted Site Disturbance / Removal Volumes	Proposed Earthwork Volumes
	Clause	Description	Permitted Volume			
Area A – Seadown Shooting Complex	8.3c	Soil Disturbance	25 m ³ per 500 m ²	158,206 m ²	7,900 m ³	Unknown
	8.3d	Soil Removal	5 m ³ per 500 m ² (per year)		1,580 m ³ (3,160 m ³ over 2 days)	
Area B – Farm Brands NZ Limited Partnership	8.3c	Soil Disturbance	25 m ³ per 500 m ²	59,437 m ²	2,950 m ³	Unknown
	8.3d	Soil Removal	5 m ³ per 500 m ² (per year)		590 m ³ (1,180 m ³ over 2 days)	
Area C – Hilton Haulage Limited Partnership	8.3c	Soil Disturbance	25 m ³ per 500 m ²	98,208 m ²	4,900 m ³	Unknown
	8.3d	Soil Removal	5 m ³ per 500 m ² (per year)		980 (1,960 m ³ over 2 days)	
Area D – Washdyke Limited Partnership	8.3c	Soil Disturbance	25 m ³ per 500 m ²	57,757 m ²	2,875 m ³	Unknown
	8.3d	Soil Removal	5 m ³ per 500 m ² (per year)		575 (1,150 m ³ over 2 days)	

7.4.2 Other Applicable Human Health Standards

For contaminants of concern that are not listed as priority contaminants, the NESCS references the Ministry for the Environment's Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values to provide guidance.

For the two heavy metals detected at the site for which SCSs are not available, nickel and zinc, the Australian National Environment Protection (Assessment of Site Contamination) Measure (NEPM)⁷ concentrations have been adopted for screening assessment purposes for a 'Commercial / industrial' land use exposure scenario.

For PAH, SCS from the Ministry for the Environment's 2011 guidance on assessing and managing petroleum hydrocarbon contaminated sites⁸ has been adopted.

⁷ Australian Government (2013) National Environmental Protection (Assessment of Site Contamination) Measure

⁸ Ministry for the Environment, 2011. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand

The Building Research Association New Zealand (BRANZ) released the New Zealand Guidelines for Assessing and Managing Asbestos in Soil on 6 November 2017. The BRANZ Asbestos (2017) Guidelines have been developed based on the WA DOH Guidelines but with the New Zealand regulatory scene in mind.

The BRANZ Guideline asbestos investigation criteria are presented in **Table 14** below. The BRANZ guideline criteria have been adopted as investigation criteria for this assessment.

Table 14: Adopted Asbestos Investigation Criteria

Form of asbestos		Soil guideline values for asbestos (w/w)			
		Residential ¹	High-density residential ²	Recreational ³	Commercial and Industrial ⁴
ACM (bonded)		0.01%	0.04%	0.02%	0.05%
FA and/or AF ⁵		0.001%			
All forms of asbestos – surface		No visible asbestos on surface soil ⁶			
Capping requirements for residual contamination above selected soil guideline value					
Depth ⁷	Hard cap	No depth limitation, no controls – except for long-term management			
	Soft cap	≥0.5 m			≥0.2 m

Notes:

ACM: Asbestos-containing material i.e. asbestos bound in a matrix; material that cannot pass through a 7 mm x 7 mm sieve.

FA: Fibrous asbestos. Encompasses friable asbestos material, such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products. Friable asbestos is defined here as asbestos material that is in a degraded condition, such that it can be broken or crumbled by hand pressure.

AF: Asbestos fines. It includes free fibres of asbestos, small fibre bundles and also ACM fragments that pass through a 7 mm x 7 mm sieve.

1. **Residential:** Single dwelling site with garden and / or accessible soil. Also includes daycare centres, preschools, primary and secondary schools and rural residential.

2. **High-density residential:** Urban residential site with limited exposed soil / soil contact, including small gardens. Applicable to urban townhouses, flats and ground-floor apartments with small ornamental gardens but not high-rise apartments (with very low opportunity for soil contact).

3. **Recreational:** Public and private green areas and sports and recreation reserves. Includes playing fields, suburban reserves where children play frequently and school playing fields.

4. **Commercial and industrial:** Includes accessible soils within retail, office, factory and industrial sites. Many commercial and industrial properties are well paved with concrete pavement and buildings that will adequately cover / cap any contaminated soils.

5. **FA and / or AF:** Where free fibre is present at concentrations at or below 0.001% w/w, a proportion of these samples should be analysed using the laboratory analysis method described in section 5.4.4 (≥10% of samples). This is due to limitations in the AS 4964-2004 and WA Guidelines 500 ml sample method for free fibre (see section 5.4 for more information).

6. **Surface:** Effective options include raking / tilling the top 100 mm of asbestos-contaminated soil (or to clean soil / fill if shallower to avoid contaminating clean material at depth) and hand picking to remove visible asbestos and ACM fragments or covering with a soft cap of virgin natural material (VNM) 100 mm thick delineated by a permeable geotextile marker layer or hard cap. Near-surface fragments of ACM can become exposed in soft soils such as sandy pumiceous soils after periods of rain.

7. **Depth:** Capping is used where contamination levels exceed soil guideline values. Considerations of depth need to incorporate the type and likelihood of future disturbance activities at the site and site capping requirements (see section 6.1). Ideally, any capping layer should be delineated by a permeable geotextile marker layer between the cap and underlying asbestos / contaminated material. Institutional controls must be used to manage long-term risks, particularly where the cap may be disturbed (see section 7). Two forms of capping are typically used:

a) Hard cap comprises surfaces that are difficult to penetrate and isolate the asbestos contamination, such as tar seal or concrete driveway cover. This would typically not include pavers or decking due to maintenance and coverage factors.

b) Soft cap consists of a layer(s) of material which either comprise virgin natural material or soils that meet the asbestos residential soil guideline value from an on-site source. Use of on-site soils may require resource consent.

7.5 Environmental Receptor Assessment Criteria

Te Mana o te Wai⁹ refers to the vital importance of water. The National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) strengthens and clarifies Te Mana o te Wai with a hierarchy of obligations introduced which means prioritising the health and well-being of water first over people's needs.

Evaluation of soil concentrations against sediment guideline criteria (Australia & New Zealand toxicant default guideline values for sediment quality (GV-high)) has been completed as an initial conservative assessment to evaluate potential stormwater runoff quality with regards to contamination.



8.1 Potential Soil Contamination Observations

The observations during the investigation are summarised below:

- The soil encountered in the majority of test locations consisted of a brown silty soil with no obvious visual or olfactory signs of contamination.
- No obvious visible metal fragments were present in the samples collected and submitted for analysis.
- Grass and vegetation growth in the majority of locations also appeared to be healthy with no obvious signs of vegetation stress or die back observed.

8.2 Analytical Results

Soil analytical results have been compared against assessment criteria for the proposed land use. The laboratory reports are included in **Appendix E** while the assessment comparison tables with selected guidelines and standards is presented in **Appendix G**.

8.2.1 Heavy Metals

Heavy metal test results from March, April, May, and July 2025 sampling can be found within **Appendix G** and show the following:

- Background concentrations of arsenic, cadmium, lead, copper, and zinc were exceeded for multiple samples.
- Five samples exceed the Commercial / Industrial Outdoor Worker (Unpaved) for lead.
- The adopted ANZG Toxicant Default Guideline Value for Sediment Quality is exceeded in six samples for copper, lead, and zinc.

⁹ Ministry for the Environment (2020) Te Mana o te Wai

8.2.2 Asbestos

The following table (Table 15) presents the results of asbestos presence and absence laboratory analysis conducted on selected samples.

Table 15: Asbestos Laboratory Results Summary				
Sample name	Date	Description of Asbestos Form	Asbestos Containing Material as % w/w of Total Sample	Asbestos as FA / AF (% w / w)
45564-TP16_0.1	16-Apr-2025	Asbestos NOT detected.	-	-
45564-TP17_0.5		Asbestos NOT detected.	-	-

8.2.3 Synthetic Precipitation Leaching Procedure

Synthetic Precipitation Leaching Procedure (SPLP), developed by the USEPA, simulates the leaching by rainfall and is assumed to give a conservative estimate of the leachate produced by a particular soil (WasteMINZ, 2023). Samples were collected to evaluate the leachability of the identified contamination within the shooting range.

The one sample tested (R2_7m_0.05 [SPLP Extract]) exceeded the adopted ANZG Toxicant Default Guideline Value for water quality (95 % LOSP) for lead and zinc. Additionally, the sample exceeded Class 1 landfill leachate values for lead indicating treatment of the soil may be required prior to disposal at a landfill should this be necessary.

8.2.4 Polycyclic Aromatic Hydrocarbons

Six of the seven samples analysed for PAH, did not contain detectable concentrations with the fourth (TP14B) from the Hilton Haulage damaged vehicle storage compound containing detectable but below background concentrations of PAHs.

8.2.5 Total Petroleum Hydrocarbons

Heavy end TPH (C15 – C36) was detected at a concentration of 40,000 mg/kg in surface soil from TP14 within the Hilton Haulage damaged vehicle storage compound. The concentration of 40,000 mg/kg indicates a light non-aqueous phase product (LNAPL) is present in the shallow soil at a concentration which exceeds the MfE petroleum hydrocarbon guidelines for industrial / commercial land. Other samples from TP14 and other test pits within the storage compound and the tyre stockpile analysed for TPH did not contain concentrations above the laboratory detection limit indicating the oil contamination is isolated and not widespread and being heavy end also not significantly mobile.

The zinc concentrations are also below ANZECC sediment quality guideline values and the risk presented by the soil in and around the tyre stockpile is likely to be suitable to remain in the drain landscaped corridor.

The NES SCS industrial soil assessment criteria used to evaluate the risk to human health is the closest match to the shooting range complex. However, the scenario (outdoor worker or unpaved) does represent the outdoor worker who carries out maintenance activities involving soil exposure to surface or near-surface soil through gardening and other landscaping activities, and occasional shallow excavation for routine underground service maintenance activities. This may be therefore overly conservative for most gun range users, with limited soil contact likely of the bund walls. However, as a Tier 1 assessment it is appropriate to compare soil concentrations to these commercial values.

9.2 Area B – Wastewater ponds

The samples from this area did not display visual or olfactory evidence of contamination from the wastewater ponds. A shallow sample (from TP08) was analysed at the laboratory for heavy metals and PAHs and returned concentrations below background concentrations.

9.3 Area C – Hilton Haulage Site

Three samples were analysed at the laboratory for heavy metal, PAH, and TPH. One sample (45564-TP14B) contained elevated heavy metals above background concentrations and ANZG Toxicant Default Guideline Value for Sediment Quality, but below the adopted SCS.

The sample (TP14B) was the only sample from Area C to return detectable levels of PAH and TPH in the laboratory analysis. PAH concentrations were below the adopted background concentrations, with a concentration for B(a)P PEF of 135 µg/kg, compared to the background concentration of 922 µg/kg. TPH results returned concentrations of 40,000 mg/kg for the C15-C36 fraction above the MfE petroleum hydrocarbon guidelines (20,000 mg/kg) and indicating LNAPL is present. This sample was linked to residue that was present on the ground surface from the storage of cars. The sample directly beneath (45564-TP14_0.1) returned non-detect for both PAH and TPH suggesting the soil contamination is a thin discrete surface layer and isolated in horizontal and vertical extent.

9.4 Area D – Stockpiles

Four soil samples were analysed for heavy metals from Area D. Two of the samples (45564-TP16_0.1 & 45564-TP17_0.1) were taken from the soil mound that is present along the boundary of the site. All four samples were below background concentrations. No asbestos was detected in the two samples analysed and no visual evidence of ACM observed during the sampling.

■■■■ ■■■■ **A** ■■■■■■■■ ■■■■

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

- Source of contamination.
- Pathway(s) in which contamination could potentially mobilise along (e.g. vapour or groundwater migration).
- Sensitive receptor(s) which may be exposed to the contaminants.
- An exposure route, where the sensitive receptor and contaminants come into contact (e.g., ingestion, inhalation, dermal contact).

The potential source, pathway, receptor linkages at this subject site are provided in **Table 16**.

Table 16: Conceptual Site Model

Location		Contaminants of concern	Potential exposure route and pathways	Receptor	Risk to receptors?
Area A	Seadown Shooting Complex Section 17 Meadows SETT	Metals (lead, antimony, arsenic, copper, zinc, tin, and nickel)	Human receptor (inhalation and/or dermal) Transport by overland flow (rainwater or seasonal water flow) and/or advection/dispersion/dissolution	Site visitors Site staff Surface water Groundwater Local flora and fauna	Unacceptable. Contaminants of concern are present at concentrations above applicable guideline values for human health and protection of aquatic receptors. The soil within and adjacent to the tyre stockpile contains zinc above background but at concentrations that meet land use standards.
	Wastewater ponds Part Section 6 Meadows SETT	Biological hazards, metals, PAHs	Human receptor (inhalation and/or dermal) Transport by overland flow (rainwater or seasonal water flow) and/or advection/dispersion/dissolution		Acceptable. No visual or olfactory evidence of contamination and analytes all below land use standards.
Area B	Byproducts factory Lot 2 DP 419868	Hydrocarbons (particularly PAHs), arsenic	Transport by overland flow (rainwater or seasonal water flow) and/or advection/dispersion/dissolution Human receptor (dermal, kai moana consumption, and/or inhalation) Potential ecological receptors (including but not limited to: terrestrial vegetation, wildlife)		Acceptable. Exposure pathways incomplete.
	Hilton Haulage Site Lot 2 DP 548518	Metals, BTEX petroleum hydrocarbons and PAHs (particularly lube oils)	Transport by overland flow (rainwater or seasonal water flow) and/or advection/dispersion/dissolution Human receptor (dermal, kai moana consumption, and/or inhalation) Potential ecological receptors (including but not limited to: terrestrial vegetation, wildlife)		Overall acceptable risk. Some surficial hydrocarbon staining and contamination is present but the risk to human health and ecological receptors is acceptable. Should the proposed drain alignment pass through this area, the surface topsoil (0.1m) would require remediation.
Area D	Stockpiles Lot 4 DP 365071 (72 Sheffield Street only)	Heavy metals and asbestos	Human receptor (inhalation and/or dermal) Transport by overland flow (rainwater or seasonal water flow) and/or advection/dispersion/dissolution		Acceptable. Contaminants of concern are present at concentrations below adopted guideline values.

The Seadown Shooting Complex (Area A), based on initial data and our experience of other firing ranges, may pose the more significant land contaminated challenges to the route. The lead soil contamination is unlikely to be a significant risk to health for those using the ranges based on the limited duration of exposure, however any amount of lead exposure can be detrimental to human health and exposure should be minimised as much as possible. The extent of contamination should be established

for assistance with the drain route planning and to assist with assessing the risk posed to the gun range users.

The soil within the exterior of the bunds (i.e. not facing the firing ranges) appears to have come from nearby sites where soil was stripped for recent developments. Analysis of the soil from the exterior of the bunds indicates that it has not been impacted by the gun range activities and meets background criteria and could be re-used on site or disposed of as cleanfill.

Within the Hilton Haulage site, some surficial soil contamination as a result of the storage of damaged vehicles has occurred. The soil contamination, consisting of elevated heavy metals and petroleum contamination is present as a discontinuous thin layer of impact likely caused by leaking automotive fluids and debris from the vehicles.

As the Seadown Drain will likely receive groundwater inflow from these sites, an assessment of groundwater quality within or adjacent to the Seadown shooting complex is also recommended to ensure discharges to groundwater and stormwater of heavy metals do not adversely impact on the water quality within the drain.

The risk of contamination from the identified soil contaminants at the Seadown shooting complex to surface water receptors is considered moderate based on the distance between contaminants and the nearest waterway. Additional resource consents may be required from TDC for earthworks on a contaminated site and the potential discharge of contaminants to the nearby lagoon and / or stormwater network.

Based on the current drain alignment A Site Management Plan, is recommended to be completed to assist contractors with managing soil at the site during earthworks. Should material be removed from site, additional consultation and potentially soil characterisation may be required by the managed fill site.



Photograph 1: View northeast towards Paul Smith Yard (5-Mar-2025).



Photograph 2: View north over Paul Smith Yard from southern boundary (5-Mar-2025).



Photograph 3: View southwest along Paul Smith Earthworks boundary (5-Mar-2025).



Photograph 4: View east across the southern half of 72 Sheffield Street. Stockpiles visible in east of site (5-Mar-2025).



Photograph 5: Stockpiles in southern half of 72 Sheffield Street containing concrete and treated timber poles (5-Mar-2025).



Photograph 6: View West from stockpiles in southern half of 72 Sheffield Street containing concrete and treated timber poles (5-Mar-2025).



Photograph 7: View east from the new building pad towards stormwater ponds in rear of Hilton Haulage yard at 144 Meadows Road (5-Mar-2025).



Photograph 8: View northeast in rear of Hilton Haulage yard at 144 Meadows Road (5-Mar-2025).



Photograph 9: Temporary vehicle storage compound for those involved in traffic accidents and recovered for storage during police investigations. Located in the rear of Hilton Haulage yard at 144 Meadows Road (5-Mar-2025).



Photograph 10: Temporary vehicle storage compound for those involved in traffic accidents and recovered for storage during police investigations. Located in the rear of Hilton Haulage yard at 144 Meadows Road (5-Mar-2025).



Photograph 11: Staining and metal debris on the ground in isolated areas of the temporary vehicle storage compound (5-Mar-2025).



Photograph 12: Staining and debris observed (16-Apr-2025).



Photograph 13: Staining and debris observed (16-Apr-2025).



Photograph 14: View east over TDC land at 116 Aorangi Road (5-Mar-2025).



Photograph 15: Burn pit adjacent to temporary vehicle storage compound (16-Apr-2025).



Photograph 16: An undated aerial photograph of the Seadown range complex, view southwest with gun range identification numbers presented (16-Apr-2025).



Photograph 17: View north from Seadown firing range complex. Wastewater ponds on left, Range 1 on right of photo (5-Mar-2025).



Photograph 18: Range 2 targets and sampling location on bund visible behind targets at approx. 1 m above range ground level (5-Mar-2025).



Photograph 19: Hardfill and road millings and asphalt surplus stockpiled in the east of the Seadown firing range complex for use on site for roading (5-Mar-2025).



Photograph 20: Example of bunding at Gun Club (16-Apr-2025).



Photograph 21: Example of bunding at Gun Club (16-Apr-2025).



Photograph 22: View from SS03 (16-Apr-2025).



Photograph 23: Clay birds adjacent to SS09 (16-Apr-2025).



Photograph 24: View north from western boundary of TDC land leased to Seadown Shooting Complex. TDC wastewater pond spillway visible in foreground and to left of photograph (5-Mar-2025).



Photograph 25: Concrete block structure and posts in north of Part Section 6 Meadows SETT by Aorangi Road (5-Mar-2025).



Photograph 26: View west towards By Products Limited at 124 Aorangi Road (8-May-2025).



Photograph 27: 124 Aorangi Road (Lot 2 DP 419868) (16-Apr-2025).



Photograph 28: Wastewater pond in west of Part Section 6 Meadows SETT (5-Mar-2025).



Photograph 29: Wastewater pond 124 Aorangi Road (Lot 2 DP 419868) (16-Apr-2025).



Photograph 30: View southwest over Part Section 6 Meadows SETT. Second wastewater pond on left of photograph. By Products Limited Plan on right (5-Mar-2025).



Photograph 31: Wastewater pond 124 Aorangi Road (Lot 2 DP 419868) (16-Apr-2025).



Photograph 32: View northwest of an above ground diesel storage tank on the By Products site (5-Mar-2025).



Photograph 33: View southwest back along proposed route of drain across ponds and wetlands on the TDC Part Section 6 Meadows SETT land and beyond (5-Mar-2025).



Photograph 34: Detail of tyre stockpiles. All on wooden pallets (16-July-2025).



Photograph 35: Tyre stockpile in the left of the image. Looking southwest (16-July-2025).



Photograph 36: SS05 location (16-July-2025).



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Dear Sir/Madam

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

The LLUR statement shows the land parcel(s) you enquired about and provides information regarding any potential LLUR sites within a specified radius.

Please note that if a property is not currently registered 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 database 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; additional relevant information may be held in other files (for example consent and enforcement files).

Please contact Environment Canterbury if you wish to discuss the contents of this property statement.

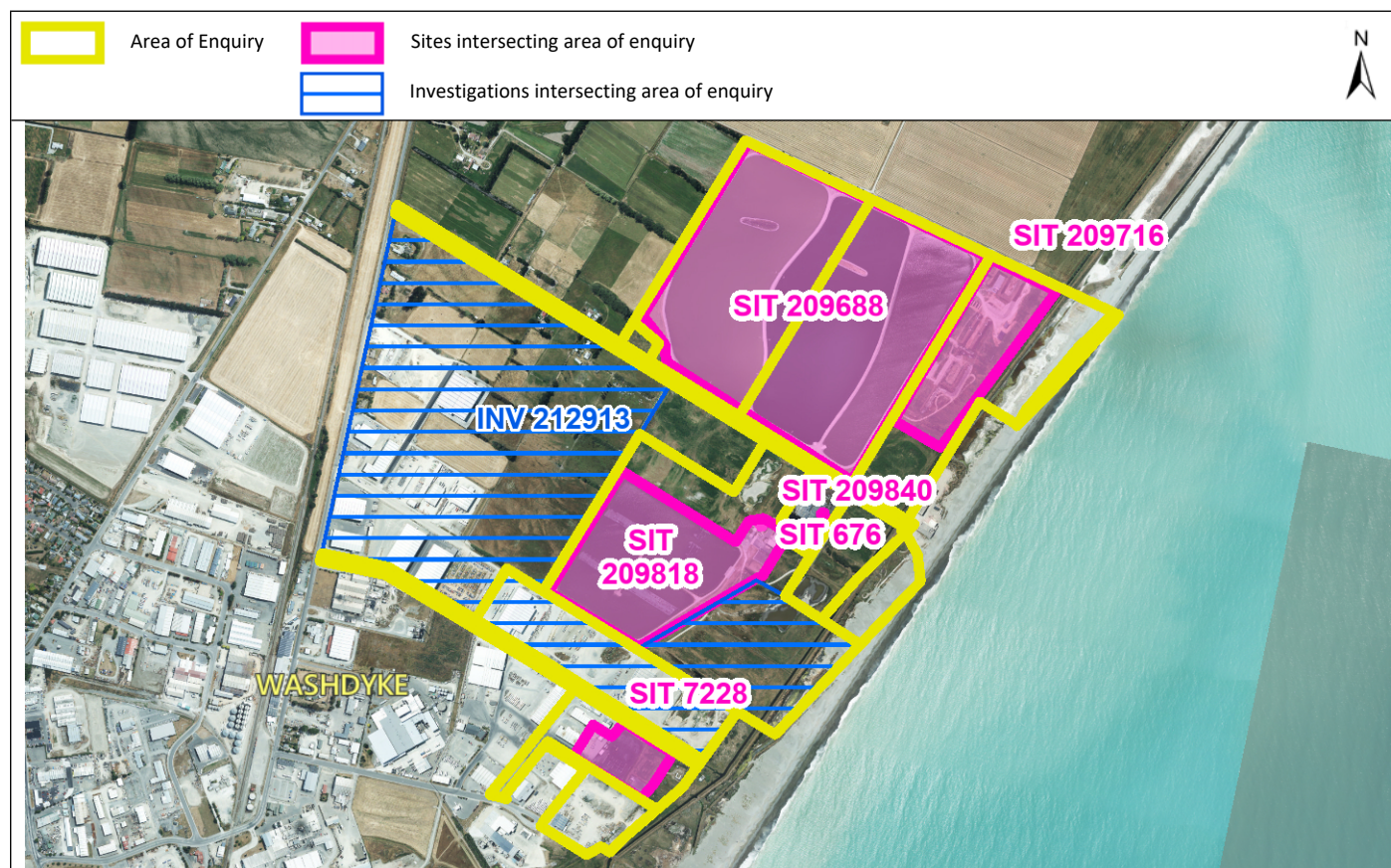
Yours sincerely

Contaminated Sites Team

Property Statement from the Listed Land Use Register

Visit ecan.govt.nz/HAIL for more information or
contact Customer Services at ecan.govt.nz/contact/ and quote ENQ411270

Date generated: 02 April 2025
Land parcels: Lot 4 DP 365071
RES 4582
Lot 2 DP 419868
Lot 2 DP 403105
Lot 2 DP 548518
Lot 1 DP 419868
Lot 2 DP 39470
Section 17 Meadows SETT
Part RES 2593
Section 5 Meadows SETT
Part Section 6 Meadows SETT
Section 4A Meadows SETT
Lot 3 DP 397304



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.

Sites at a glance

 Sites within enquiry area

Site number	Name	Location	HAIL activity(s)	Category
676	Timaru District Council Milliscreening Plant	Aorangi Rd, Washdyke, Timaru	A17 - Storage tanks or drums for fuel, chemicals or liquid waste; G6 - Waste recycling or waste or wastewater treatment;	Not Investigated

7228	Hilton Haulage - Coal Storage Facility - Washdyke	Sheffield Street, Washdyke	E5 - Coal or Coke Yards;	Not Investigated
209688	Lot 2 DP 39470	Lot 2 DP 39470	G6 - Waste recycling or waste or wastewater treatment;	Not Investigated
209716	Section 17 Meadows SETT	Section 17 Meadows SETT	C2 - Gun clubs or rifle ranges;	Not Investigated
209818	Lot 1 DP 419868	Lot 1 DP 419868	A17 - Storage tanks or drums for fuel, chemicals or liquid waste;G6 - Waste recycling or waste or wastewater treatment;	Not Investigated
209840	Lot 2 DP 419868	Lot 2 DP 419868	E5 - Coal or Coke Yards;	Not Investigated

More detail about the sites

Site 676: Timaru District Council Milliscreening Plant (Intersects enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: Aorangi Rd, Washdyke, Timaru
Legal description(s): Sec 18 Meadows Settlement

HAIL activity(s):	Period from	Period to	HAIL activity
	pre 1987	1998	Storage tanks or drums for fuel, chemicals or liquid waste
	Unknown	Present	Waste recycling or waste or wastewater treatment

Notes:

5 Apr 1998 There is one 4500 litre tank in the ground that is still in use. It contains diesel and was installed prior to 1987

9 Aug 2018 The 4,500 litre diesel storage tank on Lot 1 DP 419868 was removed as part of the waste water treatment plant upgrade in 2018. The tank was replaced with a bunded above ground diesel storage tank. (Source INV212913 - HAIL Assessment: Washdyke Industrial Expansion Zone, Timaru)



Investigations:

There are no investigations associated with this site.

Site 7228: Hilton Haulage - Coal Storage Facility - Washdyke (Intersects enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: Sheffield Street, Washdyke
Legal description(s): Lot 4 DP 365071

HAIL activity(s):	Period from	Period to	HAIL activity
	2008	Current	Coal or Coke Yards

Notes:

8 Feb 2011 A coal storage facility was established at the Hilton Haulage Transport Ltd Washdyke depot in 2008. The discharge of stormwater from the coal storage facility is authorised by resource consent CRC071944. No other hazardous substances are stored at the depot. The site participates in Environment Canterbury's Pollution Prevention programme.



Investigations:

There are no investigations associated with this site.

Site 209688: Lot 2 DP 39470 (Intersects enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: Lot 2 DP 39470
Legal description(s): Lot 2 DP 39470,Section 5 Meadows SETT

HAIL activity(s):	Period from	Period to	HAIL activity
	Unknown	Present	Waste recycling or waste or wastewater treatment

Notes:

9 Jan 2018 This record was created as part of the Timaru District Council 2018 HAIL identification project.



Investigations:

There are no investigations associated with this site.

Site 209716: Section 17 Meadows SETT (Intersects enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: Section 17 Meadows SETT
Legal description(s): Section 17 Meadows SETT

HAIL activity(s):	Period from	Period to	HAIL activity
	Unknown	Present	Gun clubs or rifle ranges, including clay target clubs that use lead munitions outdoors

Notes:

10 Jan 2018 This record was created as part of the Timaru District Council 2018 HAIL identification project.



Investigations:

There are no investigations associated with this site.

Site 209818: Lot 1 DP 419868 (Intersects enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: Lot 1 DP 419868
Legal description(s): Lot 1 DP 419868

HAIL activity(s):	Period from	Period to	HAIL activity
	pre 1987	1998	Storage tanks or drums for fuel, chemicals or liquid waste
	Unknown	Present	Waste recycling or waste or wastewater treatment

Notes:

9 Jan 2018 Timaru Domestic wastewater Treatment Plant

9 Jan 2018 This record was created as part of the Timaru District Council 2018 HAIL identification project.



Investigations:

There are no investigations associated with this site.

Site 209840: Lot 2 DP 419868 (Intersects enquiry area.)

Category: Not Investigated
Definition: Verified HAIL has not been investigated.

Location: Lot 2 DP 419868
Legal description(s): Lot 2 DP 419868

HAIL activity(s):	Period from	Period to	HAIL activity
	Unknown	Present	Coal or Coke Yards

Notes:

11 Jan 2018 This record was created as part of the Timaru District Council 2018 HAIL identification project.



Investigations:

There are no investigations associated with this site.



Nearby investigations of interest

INV 212913 **HAIL Assessment: Washdyke Industrial Expansion Zone, Timaru**
Davis Ogilvie - Preliminary Site Investigation
1 Jan 2018

Summary of investigation(s):

To support the development of pastoral land to industrial land use within the Washdyke Industrial Expansion Zone (WIEZ), a global consent for the discharge of stormwater within the zone was made. A preliminary site investigation was made and submitted in the application. A review was made of Environment Canterbury records, Timaru District Council Records, Certificates of Title, and historical aerial imagery. A site visit had been performed for a geotechnical investigation and photographs from that investigation were also reviewed.

The land had historically been used for mixed agriculture with a small number of farm houses present within the investigation area as viewed in aerial photographs from 1934. It was noted in 1986 that a fellmonger was established and 2003 that a wastewater treatment plant had been built, both neighbouring the investigation area. An area of stored scrapped vehicles was identified on Section 8 Meadows SETT. No other Hazardous Activities and Industries List (HAIL) sites were identified other than those structures built out of Phase 1 WIEZ and these had their own relevant resource consents.

The investigation has made an appropriate review of HAIL sites.

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.

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



Everything is connected

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.

¹ The 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.



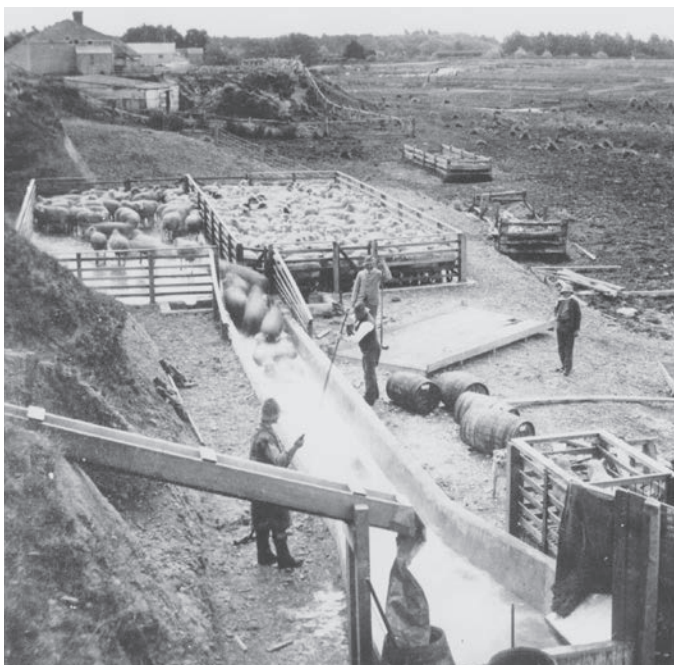
I think my site category is incorrect – how can I change it?

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)

Listed Land Use Register

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



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Fire and Emergency New Zealand
National Headquarters
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42-52 Willis Street
Wellington Central
Wellington 6011

Phone +64 4 496 3600

9 May 2025

Lizzie Wilkinson
Environmental Scientist
Davis Oglive
lizzie@do.nz

Tēnā koe Lizzie

Re: Official Information Act 1982 site requests (ref: 17903, 17904, 17905, 17906, 17907, 17908, 17909, 17910, and 17912)

Thank you for your email(s) of 2 May 2025, to Fire and Emergency New Zealand requesting the following information in relation to eight different sites in Timaru:

- I am undertaking works at the above and would like to know if any environmental incidents have occurred at this address including training, call outs, reports of hazardous substance storage.*

Thank you for your correspondence with us on 6 May 2025 where you provided the address for each site (where applicable) and confirmed you require any records we hold of fires, hazardous substance incidents, trainings, or hazardous substance storage. Your request has been considered under the Official Information Act 1982 (OIA).

The following fires or hazardous substance incidents are recorded as having occurred at the requested sites over the past twenty years:

Legal Description	CAD Number	Date	Incident Group	Incident Type
Lot 2 DP 403105	M623770	21/09/2006	Other Fire	Outside rubbish fire
Lot 2 DP 403105	F0333506	16/01/2009	Other Fire	Outside rubbish fire
Lot 2 DP 419868	F0908761	16/02/2011	Structure Fire	Structure fire with damage
Lot 4 DP 365071	F1858697	6/06/2015	Structure Fire	Structure fire with no damage
Lot 2 DP 419868	F2412020	6/11/2017	Other Fire	Outside rubbish bin, skip fire
Lot 2 DP 365071	F2131884	13/08/2016	HAZMAT	Major Hazardous Substance Incident
Lot 2 DP 419868	F3034479	6/07/2020	Other Fire	Outside rubbish bin, skip fire

Where specific sites have not been included in this table, no fires or hazardous substance incidents are recorded as having occurred there over the past twenty years.

We have also attached the SMS Incident Report (SMS Report) in relation to incident F2131884. Some information has been withheld from the SMS Report pursuant to section 9(2)(a) of the OIA, to protect the privacy of natural persons. In making this decision, we have considered the public interest considerations in section 9(1) of the OIA. We have also redacted the names of personnel involved with this incident and these have been labelled as *out of scope* in the attached PDF.

Please note the SMS Report provided to you is generated by Fire and Emergency's electronic station management system. In SMS Reports, 'Notifications' and 'Message Log' fields are reported in real time as fire crews and our communication centres communicate with each other during the incident. They are not the official final records of incidents but word for word transcripts of 'live' situations as they occur. For this reason, they may contain spelling errors or commonly used abbreviations.

The only record we have of trainings occurring at any of these sites is a house burn training in September 2012, which is recorded as occurring at 101 Aorangi Road, Washdyke. We do not hold any records of hazardous substances being stored at any of these sites.

You have the right to seek an investigation and review by the Ombudsman of this decision. Information about how to make a complaint is available at www.ombudsman.parliament.nz or freephone 0800 802 602.

We trust that the information being provided is of assistance. If you require further information, please email officialinformationrequests@fireandemergency.nz

Nāku noa, nā



Aidan Saunders
Manager, Information Requests



SMS Incident Report

05/05/2025 12:44:40

Summary

CAD Number F2131884 **Status** Closed

Station Washdyke Station

Incident Started 13/08/2016 12:14:41 **Incident Ended** 13/08/2016 19:07:12

Incident Type 4201: Major Hazardous Substance Incident

Common Name JUICE PRODUCTS NEW ZEALAND TIMARU

Address 55 SHEFFIELD STREET WASHDYKE

Alarm Method 111 Telephone **Alarm Level** 2

PFA Number

Zone 358111

Map Grid E 1460766 **Map Grid N** 5087012

First Caller 9(2)(a) **First Caller Contact** 9(2)(a)

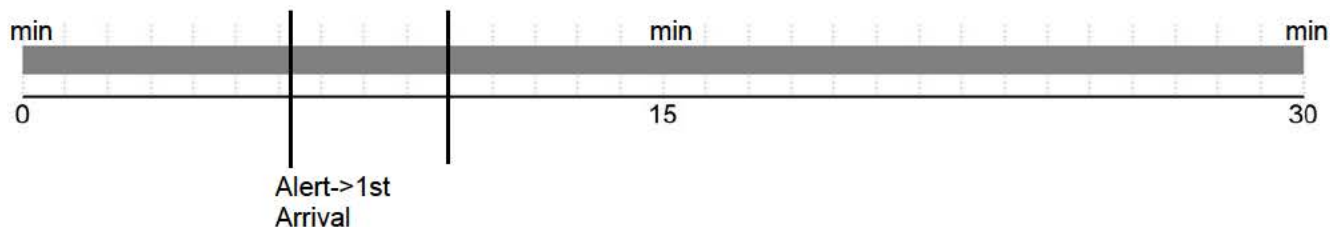
Incident Closed 13/08/2016 19:30:33

Report Completed 16:56, Mon 22 Aug 2016 by Out of Scope

Responses

Call Sign	Type	Station Alert	Enroute Time	Arrival Time	Departed
WASH817	PR	12:16:03 13 Aug 2016	12:17:32 13 Aug 2016	12:21:31 13 Aug 2016	19:05:59 13 Aug 2016
TIMA804	PM	12:16:06 13 Aug 2016	12:17:39 13 Aug 2016	12:33:15 13 Aug 2016	19:07:10 13 Aug 2016
SOUTHCANT2	OF	12:44:01 13 Aug 2016	12:44:01 13 Aug 2016	12:51:25 13 Aug 2016	19:11:24 13 Aug 2016
TIMA8018	CUHU	12:35:20 13 Aug 2016	13:02:11 13 Aug 2016	13:15:26 13 Aug 2016	19:11:31 13 Aug 2016
TEMU861	P1	13:04:02 13 Aug 2016	13:09:14 13 Aug 2016	13:21:13 13 Aug 2016	19:03:12 13 Aug 2016
TIMA8011	WT	13:04:05 13 Aug 2016	13:15:51 13 Aug 2016	13:24:30 13 Aug 2016	16:34:55 13 Aug 2016
TIMA8029	VN	14:36:48 13 Aug 2016	14:37:11 13 Aug 2016	14:45:09 13 Aug 2016	19:18:38 13 Aug 2016
TIMA801	P1	13:04:03 13 Aug 2016	16:37:42 13 Aug 2016	16:37:43 13 Aug 2016	19:00:59 13 Aug 2016

Start->Alert 7 min 10 min



Elapsed Times

Call Sign	Start To Alert	Alert To Arrival	Start To Arrival	Start To Departed
WASH817	00:01:22	00:05:28	00:06:50	06:51:18
TIMA804	00:01:25	00:17:09	00:18:34	06:52:29
SOUTHCANT2	00:29:20	00:07:24	00:36:44	06:56:43
TIMA8018	00:20:39	00:40:06	01:00:45	06:56:50
TEMU861	00:49:21	00:17:11	01:06:32	06:48:31
TIMA8011	00:49:24	00:20:25	01:09:49	04:20:14
TIMA8029	02:22:07	00:08:21	02:30:28	07:03:57
TIMA801	00:49:22	03:33:40	04:23:02	06:46:18

Notifications

Date	Time	Party Notified
13 Aug 2016	12:35:11	AREA STH CANTY - HAZ
13 Aug 2016	12:37:39	ECAN - DETAILS GIVEN - ON CALL BEING CONTACTED WHO WILL CONTACT FIRECOM
13 Aug 2016	12:41:05	FROM TIMARU STN ONLY ONE ON STN AT THIS STAGE AS SOON AS CREW AVAIL THEY
13 Aug 2016	12:44:59	WORKSAFE - DETAILS GIVEN - ON CALL HESO NOTIFIED - WILL CALL BACK IF
13 Aug 2016	13:12:44	ECAN - Out of Scope PHONED FIRECOM - WOULD LIKE TO TALK TO CUHU WHEN SET UP
13 Aug 2016	13:14:40	POLICE
13 Aug 2016	13:14:41	AMB
13 Aug 2016	13:16:05	CM SOUTHERN
13 Aug 2016	13:17:26	ECAN - Out of Scope - PATCHED TO TIMA804 BY PHONE
13 Aug 2016	13:17:47	CM Out of Scope ACK
13 Aug 2016	15:39:41	NATIONAL HAZSUB ADVISOR PAGED Out of Scope)
13 Aug 2016	16:01:31	Out of Scope PATCHED THROUGH TO TIMA8018
13 Aug 2016	16:17:28	Out of Scope PATCHED THROUGH TO TIMA8018 AGAIN

Message Log

Time	Message
12:15:06	INC INFO: ACID SPILL
12:15:09	** LOI search completed at 13/08/16 12:15:09
12:15:12	APPROX 1000L RAW

12:15:29 INFMT STATING IT HAS BEEN DILUTED WITH WATER
12:15:42 HAS A CHEMICAL MAN ON SITE AND HE IS SAYING THAT IT IS APPROX 10 %
12:15:57 ** Recommended unit WASH817 for requirement RESCUE (>1.7 km)
12:15:57 ** Recommended unit TIMA804 for requirement PUMP (>4.7 km)
12:16:19 HAS BEEN SPILT INSIDE THE FRONT ENTRANCE
12:16:32 UN 3264
12:16:44 AL: PAGING ACK RECEIVED FROM STATION 3581 at 13/08/16 12:16:44
12:17:06 CHEMICAL MAN HAS BEEN DOING SOME TESTS ON IT
12:17:18 NO ONE HAS COME INTO CONTACT WITH OR BEEN AFFECTED BY IT
12:17:33 Unit WASH817 [K1 : PROCEEDING TO INCIDENT]
12:17:40 Unit TIMA804 [K1 : PROCEEDING TO INCIDENT]
12:19:25 AL: PAGING ACK TIMED OUT FOR STATION: 3580 at 13/08/16 12:19:25
12:20:10 Unit TIMA804 [COMCEN COM : MESSAGE] UN3264 - AN INORGANIC ACID - DILUTED TO 10%
12:20:10 AND SPILL IS INSIDE THE FROM ENTRANCE
12:21:32 Unit WASH817 [K55 : SPECIAL SERVICE EVENT]
12:22:00 Unit WASH817 [KC : UNIT CALLING]
12:23:11 Unit WASH817 [SITREP :] HAG CODES
12:23:24 Unit WASH817 [COMCEN COM : MESSAGE] HAG CODES TRANSMITTED
12:33:02 Unit TIMA804 [KP : PRIORITY MESSAGE]
12:33:15 Unit TIMA804 [K2 : IN ATTENDANCE AT INCIDENT]
12:34:44 Unit TIMA804 [SITREP :] SSO Out of Scope 1000 LITRE ICB HAS LEAKED INTO BUNDED AREA
12:34:44 - FROM THAT AREA SOME MAY HAVE LEAKED INTO WATERWAY ADVISE ECAN -
12:34:58 Unit TIMA804 [SITREP :] HAZM, AT UNIT 1
12:38:38 Unit TIMA804 [SITREP :] 2 CREW IN LEVEL 3 AND BA CHECKING THAT TEMP BUND IS HOLDING - AVAILABILITY WILL BE INSTIGATED WITH CALL BACK - CONTAINER IS IN STORAGE - UNKNOWN CAUSE OF LEAK
12:38:38 WILL RESPOND
12:41:05
12:41:07 XX
12:41:08 ..
12:44:02 Unit SOUTHCANT2 [K1 : PROCEEDING TO INCIDENT]
12:44:59 REQUIRED
12:45:40 Unit WASH817 [KC : UNIT CALLING]
12:46:51 Unit WASH817 [SITREP :] TRADE NAME AC-300 BLEND OF MAJORITY NITRIC ACID AND FOSTRIC ACID
12:46:51
12:47:35 Unit WASH817 [KC : UNIT CALLING]
12:48:25 Unit WASH817 [SITREP :] CAN WE GET AN IDEA IF WE CAN CLEAN THIS WITH A SUCKER TRUCK
12:48:25
12:49:04 Unit WASH817 [COMCEN COM : MESSAGE] SOUTHCANT2 IS ENROUTE AND ECAN IS YET TO

12:49:04 GET BACK TO US

12:49:23 COVERING UNIT TIMA801 DISPATCHED TO STATION TIMARU AT

12:49:23 D0730061

12:49:54 COVER MOVE MADE AS NO RESPONSE YET FROM TIMA8018

12:49:55 ***

12:51:04 Unit SOUTHCANT2 [KC : UNIT CALLING]

12:51:25 Unit SOUTHCANT2 [K2 : IN ATTENDANCE AT INCIDENT]

12:51:39 Unit SOUTHCANT2 [SITREP :] CHECKING ADDRESS BUT CAN SEE TRUCKS

13:01:59 Unit TIMA804 [COMCEN COM : MESSAGE] THE HAZMAT UNIT IS JUST ABOUT TO RESPOND

13:02:12 Unit TIMA8018 [K1 : PROCEEDING TO INCIDENT]

13:03:29 Unit TIMA804 [SITREP :] WHAT ALARM LEVEL ARE WE AT - 1ST PLUS HAZMAT - RGR

13:03:29 MAKE SECOND ALARM

13:03:53 ** Alarm level updated to 2

13:03:53 ** Recommended unit TIMA8011 for requirement TANKER (>4.7 km)

13:03:53 ** Recommended unit TIMA801 for requirement PPUMP (>4.7 km)

13:03:53 ** Recommended unit TEMU861 for requirement PUMP (>12.9 km)

13:05:57 Unit TIMA8018 [KC : UNIT CALLING]

13:07:05 Unit TIMA8018 [SITREP :] WONDERING IF THERE HAS BEEN A SAFE FORWARD POINT -

13:07:05 817 ADVISE AAM VEHICLE IN SHEEFERLD ST

13:09:15 Unit TEMU861 [K1 : PROCEEDING TO INCIDENT]

13:09:36 Unit TIMA804 [COMCEN COM : MESSAGE] FYI THE SECOND ALARM IS THE 3RD TIME WE HAVE

13:09:36 ACTIVATED AVAILABILITY AND WE HAVE ONLY HAD 2 MEN RESPOND AND THEY ARE

13:09:36 RESPONDINGT ON THE HAZMAT NOW

13:10:01 Unit TEMU861 [KC : UNIT CALLING]

13:11:24 Unit TEMU861 [SITREP :] HAS A SFP BEEN ESTABLISHED - THERE IS AND AAM CAR IN

13:11:24 SHEFFIELD ST THSAT HAS BEEN ESTABLISHED AS SFP

13:12:11 Unit TIMA804 [KC : UNIT CALLING]

13:12:12 ***

13:12:44 **

13:12:44 #9(2)(a)

13:13:01 TIMA STATION ADVISE THEY HAVE 2 ON STATION - DO YOU REQUIRE TANKER - THAT IS ONE

13:13:01 OF THE REQUIREMENTS FOR SECOND ALARM SO AFFIRMATIVE

13:13:02 **

13:14:42 *

13:15:02 Unit TIMA804 [SITREP :] CAN WE GET ECAN ON SITE URGENTLY AS WE HAVE ACID

13:15:02 GETTING INTO WATERWAYS

13:15:11 **

13:15:12 FIR2AMB&POL - FYI ONLY AT THIS STAGE

13:15:13 **

13:15:27 AMBO EVENT 0964-3-2016/08/13-FIR LINKED AT 13/08/2016 13:15:27

13:15:27 Unit TIMA8018 [K2 : IN ATTENDANCE AT INCIDENT]

13:15:28 Unit TIMA804 [COMCEN COM : MESSAGE] CAN WE PUT REP THROUGH TO YOUR CELL PHONE

13:15:52 Unit TIMA8011 [K1 : PROCEEDING TO INCIDENT]

13:15:56 Unit TIMA804 [SITREP :] AFFIRMATIVE - SET OFF SOUNDER

13:16:11 ***

13:16:27 EXTERNAL ALERT ACTIVATED ON TIMA804

13:16:30 ***

13:17:17 **

13:17:27 *

13:21:13 Unit TEMU861 [K2 : IN ATTENDANCE AT INCIDENT]

13:24:30 Unit TIMA8011 [K2 : IN ATTENDANCE AT INCIDENT]

13:25:52 Unit TIMA804 [KC : UNIT CALLING]

13:27:41 Unit TIMA804 [SITREP :] SSO Out of Scope - EEMA PARR INCIDENT RESPONSE OFFICER -

13:27:41 SHIS HAPPY WITH THE AMOUNT CONTAINED AND THE AMOUNT IN THE PIPE AND SHE IS HAPPY

13:27:41 TO HAVE IT DILUTED

13:45:04 Unit TIMA8018 [KC : UNIT CALLING]

13:45:37 Unit TIMA8018 [K44 : COMMAND OR CONTROL POINT ESTABLISHED - OIC AND LOCATION]

13:45:37 SSO Out of Scope - SHEFFIELD COMMAND

13:50:56 Unit SOUTHCANT2 [K6 : ON TELEPAGER]

13:53:16 Unit TIMA804 [K22-1 : UNIT AVAILABLE FOR A FURTHER EVENT] SOUTHCANTY2 ADVISES

13:53:16 THAT THIS PUMP WILL BE AVAILABLE IF REQUIRED IN TIMARU

13:57:59 Unit TIMA8018 [KC : UNIT CALLING]

14:09:46 *

14:10:48 TIMARU STATION ADV 3 CREW ON STATION - AAM Out of Scope ADV THEM TO NOTIFY FIRECOM

14:10:53 WILL HAVE TO BE BACKED UP FOR ALL CALLS

14:10:55 *

14:11:13 Unit TIMA801 [K7 : AT NORMAL STATION]

14:12:19 Unit TIMA8018 [KC : UNIT CALLING]

14:12:56 Unit TIMA8018 [SITREP :] APPROX 500 LTRS OF ACID SPILT GTWW 1 MONITOR AND 2 DELIVERIES

14:12:56

14:34:09 TIMA801 FULLY CREWED

14:37:11 Unit TIMA8029 [K1 : PROCEEDING TO INCIDENT]

14:42:58 Unit TIMA8018 [KC : UNIT CALLING]

14:43:38 Unit TIMA8018 [SITREP :] PH LEVEL READING IS 2 - WE WILL BE DILUTING FURTHER

14:45:09 Unit TIMA8029 [K2 : IN ATTENDANCE AT INCIDENT]

15:13:54 Unit TIMA804 [K4 : ON RT INSIDE NORMAL TURNOUT AREA]

15:20:06 Unit TIMA8018 [COMCEN COM : MESSAGE] QUERY FROM TEMUKA STATION - DO THE TEMUKA

15:20:06 CREW REQUIRED TO BE RELIEVED

15:23:25 Unit TIMA8018 [KC : UNIT CALLING]

15:24:04 Unit TIMA8018 [SITREP :] WE DO NOT NEED RELIEF FOR 861

15:26:53 Unit TIMA8018 [SITREP :] STILL ATTEMPTING TO DILUTE - 10 X 25 AREA OF ACID -

15:26:53 IF READINGS HAVEN'T COME DOWN ON THE NEXT TEST WE WILL GO TO DIFFERENT TACTICS

15:27:23 Unit TIMA8018 [SITREP :] ABOVE SITREP BY PHONE

15:34:17 Unit TIMA8018 [KC : UNIT CALLING]

15:35:08 Unit TIMA8018 [SITREP :] CAN YOU GET Out of Scope TO CONTACT US

16:34:56 Unit TIMA8011 [K4 : ON RT INSIDE NORMAL TURNOUT AREA]

16:35:04 Unit TIMA8018 [KC : UNIT CALLING]

16:36:47 Unit TIMA8018 [SITREP :] ON ADVISE FROM Out of Scope WE WILL BE USING

16:36:47 POTASH TO ABSORB THIS - 2 MEN IN LEVEL 3 SUITS - TEMU861 WILL BE COVERING TIMARU

16:36:47 AREA - RESPOND 801

16:37:44 Unit TIMA801 [K2 : IN ATTENDANCE AT INCIDENT]

16:40:29 AL: PAGING ACK TIMED OUT FOR STATION: 3580 at 13/08/16 16:40:29

16:47:41 Unit SOUTHCANT2 [K1 : PROCEEDING TO INCIDENT]

16:47:49 Unit SOUTHCANT2 [K1 : PROCEEDING TO INCIDENT]

16:53:46 Unit SOUTHCANT2 [K2 : IN ATTENDANCE AT INCIDENT]

17:36:45 Unit TEMU861 [K4 : ON RT INSIDE NORMAL TURNOUT AREA]

17:38:51 AAM Out of Scope TRANSFERRED TO NAT HAZ SUB Out of Scope

18:03:37 Unit TIMA8018 [KC : UNIT CALLING]

18:05:15 Unit TIMA8018 [SITREP :] NOW PUMPING OUT A POOLED AREA IN THE CAR PARK AND THE

18:05:15 ARERA WITH SODA ASH HAS HAD NOT REACTION

18:10:26 Unit TIMA8018 [SITREP :] THE PUMPING OUT IS INTO A TRAYED WASTE AREA

18:11:43 Unit SOUTHCANT2 [K2 : IN ATTENDANCE AT INCIDENT]

18:11:50 Unit SOUTHCANT2 [KC : UNIT CALLING]

18:25:53 Unit TIMA804 [K1 : PROCEEDING TO INCIDENT]

18:27:37 Unit TEMU861 [K1 : PROCEEDING TO INCIDENT]

18:29:22 Unit SOUTHCANT2 [SITREP :] SPOKEN TO Out of Scope WE ARE CURRENTLY

18:29:22 PUMPING A LARGE PUDDLE INTO A TRADE WASTE SEWER ONCE THAT DONE WE WILL PUT SODA

18:29:22 ASH OVER WHATS LEFT CORDON THE AREA AND LEAVE

18:36:04 Unit TEMU861 [K2 : IN ATTENDANCE AT INCIDENT]

18:38:15 Unit TIMA804 [K2 : IN ATTENDANCE AT INCIDENT]

18:49:08 Unit TIMA8018 [KC : UNIT CALLING]

18:49:51 Unit TIMA8018 [SITREP :] INCIDENT IN HANDS OF COMPANY REP 9(2)(a)

18:49:51 SHEFFIELD COMMAND WILL NOW BE STANDING DOWN

19:01:01	Unit TIMA801 [K4 : ON RT INSIDE NORMAL TURNOUT AREA]
19:03:13	Unit TEMU861 [K3 : ON RT OUTSIDE NORMAL TURNOUT AREA]
19:06:01	Unit WASH817 [K4 : ON RT INSIDE NORMAL TURNOUT AREA]
19:06:50	Unit TIMA804 [KC : UNIT CALLING]
19:07:12	Unit TIMA804 [K4 : ON RT INSIDE NORMAL TURNOUT AREA]
19:07:13	Unit TIMA804 [K47 : STOP MESSAGE: MESSAGE UNCHANGED FROM INFORMATIVE] SSO
19:07:13	Out of Scope
19:11:26	Unit SOUTHCANT2 [K6 : ON TELEPAGER]
19:11:33	Unit TIMA8018 [K4 : ON RT INSIDE NORMAL TURNOUT AREA]
19:18:40	Unit TIMA8029 [K7 : AT NORMAL STATION]
19:30:27	UNIT TIMA801 RESPONSE TIME [NULL] ADJUSTED TO
19:30:32	UNIT SOUTHCANT2 ALERT TIME [NULL] ADJUSTED TO
19:30:32	UNIT SOUTHCANT2 ALERT TIME [NULL] ADJUSTED TO
19:30:32	** Assigned Result Code: HAZ, Detailed Event Type: 1400, Qualifier 1: Q1,
19:30:32	Qualifier 2:
19:30:33	UNIT SOUTHCANT2 ALERT TIME [NULL] ADJUSTED TO

Incident

CAD Number F2131884
Incident Reporter Out of Scope
Incident Controller Out of Scope
Distance Travelled (km) 3
Delay In Receiving Call Attempted to control incident

Property Details

Occupant
Building Owner Owner occupied
General Property Use Industrial, Manufacturing
Special Property Use Canning, Packaging, Preserving or Dehydrating Food/Juice
Purpose Group

Actions

Persons Reported Trapped No
Evacuation Status No evacuation
Action Prior 1 Removal of hazard
Action Prior 2
Action Taken Haz substance: Identified, contained, made safe

Civilians

Civilians Rescued	0
Civilians Extricated	0
Civilians Assisted	0
Civilians Evacuated	

Origin

Location	Product storage, Tank, Bin, Agri storage, Hay
Level	

Equipment Used

Quantity	Equipment
1	Ejector pump
1	
1	Low pressure delivery
1	

Equipment Involved

Equipment Involved

Year

Make

Model

Hazardous Materials

Control	Controlled incident: Hazardous substance removed
Activation of detection and control systems	Manual closedown of plant and equipment
Extent of Spread on Arrival	Spread not confined to property of origin
Wind Direction on Arrival	South
Wind Speed on Arrival	Light breeze
Cause of Leakage	Installation deficiency
Environ. Contamination	Fresh Water: Rivers, streams, creeks
Population Density	Commercial: Low density
Primary Advice	Fire Service information
Secondary Advice	Company agent/rep of product causing incident

Chemicals

Trade Name	NITRIC ACID (2031)
Hazard Class	8
UNSI	2031

Quantity of Leakage	Unknown
Substance Leaking From	Tank, bulk storage
Number of Containers	2
Container Labeling	Yes
Method of Disposal	Neutralised
Org. Responsible for Disposal	Incident completed by Fire and Emergency NZ
Place of Disposal	Unable to classify

Comments

8/22/2016 4:56:07 PM

Reporter Comments

Spill occurred over night and was detected around 7 am. it had leaked out of an ICB run across shingle yard and into a low lying area which led to a sump, into a pipe and then into a creek. Staff had blocked pipe to stop flow. Some product was transferred to another container. Fire Service called 4 - 5 hrs after initial leak discovered. Contact was made with ECAN rep via phone. permission given to dilute and wash away. Product was eventually disposed of using trade waste drain 4 level 3 suits, 4 pr gumboots and part bag of soda ash used

Out of Scope



Photograph 1:

1975 – 1979 (Canterbury Maps).



Photograph 2:

1977 (Retrolens).



Photograph 3:

1980 – 1984 (Canterbury Maps).



Photograph 4:

1981 (Retrolens)



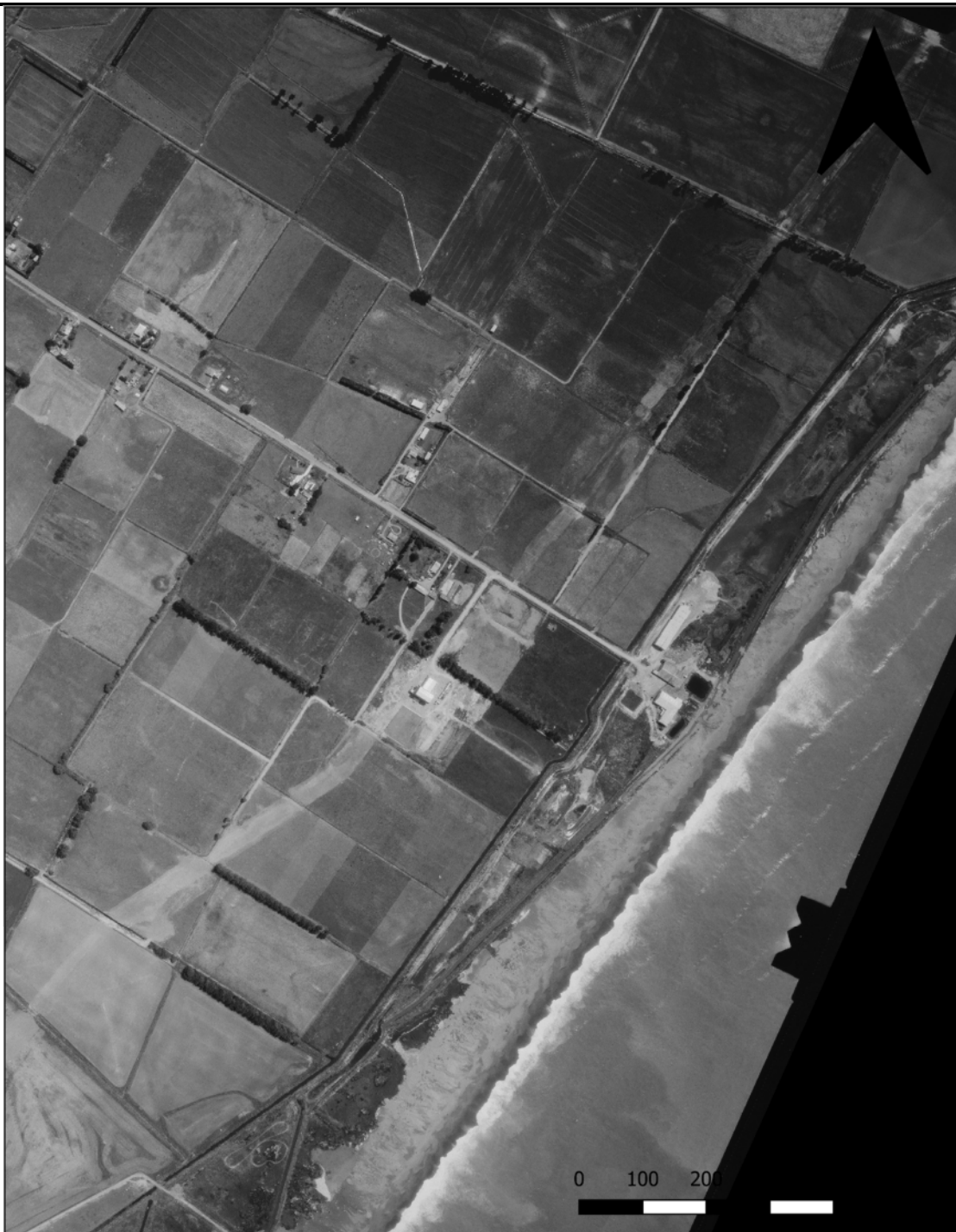
Photograph 5:

1984 (Retrolens).



Photograph 6:

1984 – 1989 (Canterbury Maps)



Photograph 7:

1987 (Retrolens).



Photograph 8:

1995 – 1999 (Canterbury Maps).



Photograph 9:

1998 (Retrolens).



Photograph 10:

1999 (Retrolens).



Photograph 11:

2004 – 2010 (Canterbury Maps)



Photograph 12:

2010 – 2015 (Canterbury Maps).



Photograph 13: 2010 (Google Earth).



Photograph 14:

2011 (Google Earth).



Photograph 15:

2012 (Google Earth).



Photograph 16:

2013 (Google Earth).



Photograph 17:

2015 (Google Earth).



Photograph 18:

2018 (Google Earth).



Photograph 19:

2019 (Google Earth).



Photograph 20:

2020 (Google Earth).



Photograph 21:

2023 (Canterbury Maps).



Quote No

Primary Contact

Submitted By

Client Name

Address

Postcode

Phone

Mobile

Email

Charge To

Client Reference

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

ADDITIONAL INFORMATION

ANALYSIS REQUEST

Job No: Date Recv: 18-Mar-25 16:06

R J Hill Laboratories Limited
1/17 Print Place
Middleton
Christchurch 8024, New Zealand

381 8338

Received by: Harsharan Kaur

0508 HILL LAB (44 555 22

+64 7 858 2000

mail@hill-labs.co.nz

www.hill-labs.co.nz



3138183387

21.9

CHAIN OF CUSTODY RECORD

Sent to

Hill Laboratories

Date & Time:

Name:

☒ Tick if you require COC
to be emailed back

Signature:

Samples will be processed at a Hill Labs site with the appropriate testing
capability and capacity. Please inform the lab if you wish samples to be
retained and analysed at the site of receipt.

Received at

Hill Laboratories

Date & Time:

Name:

Signature:

Priority

☐ Low☒ Normal☐ High☐ Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

Please ensure all asbestos samples are **individually
double bagged** upon submission to the laboratory.

No.	Sample Name	Sample Material	Sample Location	Sample Date	Tests Required (if not as per Quote)
1	R3 - 0.05	S.1	-	5/3/2025	Heavy metals
2	R4 - 0.05				
3	R6 - Bank wall				
4	R2 - bank wall				
5	Swale sediment				
6	R04 - 0.1				
7	R2 - 7 - 0.05				
8					
9					
10					
11					
12					

Continued on next page

Certificate of Analysis

Page 1 of 2

Client:	Davis Ogilvie & Partners Limited	Lab No:	3818338	SPV2
Contact:	Gareth Oddy	Date Received:	18-Mar-2025	
	C/- Davis Ogilvie & Partners Limited	Date Reported:	11-Apr-2025	(Amended)
	PO Box 589	Quote No:	82763	
	Addington	Order No:	45564	
	Christchurch 8140	Client Reference:		
		Submitted By:	Gareth Oddy	

Sample Type: Soil

Sample Name:		R3_0.05 05-Mar-2025	R4_0.05 05-Mar-2025	R4_Bund Wall 05-Mar-2025	R2_Bund Wall 05-Mar-2025	Swale Sediment 05-Mar-2025
Lab Number:		3818338.1	3818338.2	3818338.3	3818338.4	3818338.5
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 2	2	2	20	31
Total Recoverable Cadmium	mg/kg dry wt	0.13	< 0.10	< 0.10	0.30	0.34
Total Recoverable Chromium	mg/kg dry wt	10	11	10	9	12
Total Recoverable Copper	mg/kg dry wt	18	7	15	230	48
Total Recoverable Lead	mg/kg dry wt	260	31	240	14,200	570
Total Recoverable Nickel	mg/kg dry wt	6	7	5	6	8
Total Recoverable Zinc	mg/kg dry wt	34	38	34	112	130

Sample Name:	R04_0.1m 05-Mar-2025	R2_7m_0.05 05-Mar-2025
Lab Number:	3818338.6	3818338.7

Individual Tests

SPLP Sample Weight	g	-	50
SPLP Extractant Type*		-	De-ionised Water, pH 5.8 +/- 0.4
SPLP Final pH	pH Units	-	7.8
pH*	pH Units	-	5.8
Total Organic Carbon*	g/100g dry wt	-	2.4

Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	2	6
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.11
Total Recoverable Chromium	mg/kg dry wt	10	11
Total Recoverable Copper	mg/kg dry wt	6	185
Total Recoverable Lead	mg/kg dry wt	12.8	5,500
Total Recoverable Nickel	mg/kg dry wt	6	6
Total Recoverable Zinc	mg/kg dry wt	39	76

Sample Type: Aqueous

Sample Name:	R2_7m_0.05 [SPLP Extract]
Lab Number:	3818338.8

Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn

Total Arsenic	g/m ³	0.0062
Total Cadmium	g/m ³	< 0.000053
Total Chromium	g/m ³	0.00160
Total Copper	g/m ³	0.043
Total Lead	g/m ³	1.02
Total Nickel	g/m ³	0.00102
Total Zinc	g/m ³	0.0155

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3818338-SPv1' issued on 21-Mar-2025 at 5:12 pm.
Reason for amendment: Additional testing added as per client request.

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-7
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	7
Soil Prep Dry & Sieve for Agriculture	Air dried at 35°C and sieved, <2mm fraction.	-	7
pH*	1:2 (v/v) soil : water slurry followed by potentiometric determination of pH. In-house.	0.1 pH Units	7
Total Organic Carbon*	Acid pretreatment to remove carbonates present followed by Catalytic Combustion (O ₂), separation, Thermal Conductivity Detector [Elementar Analyser].	0.05 g/100g dry wt	7
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	1-7
SPLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1312.	-	7
SPLP Profile			
SPLP Sample Weight	Gravimetric. US EPA 1312.	0.1 g	7
SPLP Extractant Type*	US EPA 1312 (Modified for New Zealand conditions to use De-ionised Water unless otherwise specified).	-	7
SPLP Final pH	pH meter. US EPA 1312.	0.1 pH Units	7

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	8
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.000053 - 0.0011 g/m ³	8

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

Testing was completed between 19-Mar-2025 and 11-Apr-2025. For completion dates of individual analyses please contact the laboratory.

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

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

Ara Heron BSc (Tech)
Client Services Manager - Environmental



Quote No

Primary Contact Julian WashingtonSubmitted By Julian WashingtonClient Name Davis Gilvue & Partners Ltd

Address

Postcode

Phone

Mobile

Email

Charge To

Client Reference 45564

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 lareth@do.nz☐ Other

ANALYSIS REQUEST

R J Hill Laboratories Limited
1/17 Print Place
Middleton
Christchurch 8042, New Zealand

0508 HILL LAB (44 555 22)

+64 7 858 2000

mail@hill-labs.co.nz

www.hill-labs.co.nz

Job No: Date Recv: 17-Apr-25 12:23

386 2435

Received by: Danielle McNeilly



3138624358

CHAIN OF CUSTODY RECORD

Sent to

Hill Laboratories

Date & Time:

Name:

☐ Tick if you require COC
to be emailed back

Signature:

Received at

Hill Laboratories

(Refer to Lab created Job
No above)

Date & Time:

Name:

Signature:

Condition

☐ Room Temp☐ Chilled☐ Frozen

Temp:

4.1

ADDITIONAL INFORMATION / KNOWN HAZARDS

Priority

☐ Low☒ Normal☐ High☐ Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	45564-TP08-0.1	16-04-25	15:00	Soil	cold 1612
2	" " 0.3		15:05		
3	" TP11-0.1				
4	" " -0.3				
5	" TP12-0.1				
6	" " 0.3				
7	" TP13-0.1				
8	" " 0.4				
9	" TP14-0.1				
10	" " 0.3				
11	" TP14 TP14-B				
12	" TP15-0.1				

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
13	45564 - TP15 - 0.3	16-4-25		Soil	cold hold
14	" TP16 - 0.1	↓		↓	↓
15	" " 0.5				
16	" TP17 - 0.1				
17	" " 0.5				
18	" TP18 - 0.1				
19	" " 0.3				
20	" TP19 - 0.1				
21	" " 0.3	↓		↓	↓
22					
23					
24					
25					
26					
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28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

Job Information Summary

Client:	Davis Ogilvie & Partners Limited	Lab No:	3862435
Contact:	Julian Washington	Date Registered:	17-Apr-2025 4:11 pm
	C/- Davis Ogilvie & Partners Limited	Priority:	High
	PO Box 589	Quote No:	82763
	Addington	Order No:	
	Christchurch 8140	Client Reference:	45564
		Add. Client Ref:	
		Submitted By:	Julian Washington
		Charge To:	Davis Ogilvie & Partners Limited
		Target Date:	23-Apr-2025 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	45564-TP08_0.1 16-Apr-2025 3:00 pm	Soil	GSoil300	Hold Cold HM + PAH
2	45564-TP08_0.3 16-Apr-2025 3:05 pm	Soil	GSoil300	Hold Cold
3	45564-TP11_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold HM + PAH + TPH
4	45564-TP11_0.3 16-Apr-2025	Soil	GSoil300	Hold Cold
5	45564-TP12_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold
6	45564-TP12_0.3 16-Apr-2025	Soil	GSoil300	Hold Cold
7	45564-TP13_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold
8	45564-TP13_0.4 16-Apr-2025	Soil	GSoil300	Hold Cold
9	45564-TP14_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold HM + PAH + TPH + BTEX
10	45564-TP14_0.3 16-Apr-2025	Soil	GSoil300	Hold Cold
11	45564-TP14B 16-Apr-2025	Soil	GSoil300	Hold Cold HM + PAH + TPH
12	45564-TP15_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold
13	45564-TP15_0.3 16-Apr-2025	Soil	GSoil300	Hold Cold
14	45564-TP16_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold HM + Asbestos PA
15	45564-TP16_0.5 16-Apr-2025	Soil	GSoil300	Hold Cold
16	45564-TP17_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold
17	45564-TP17_0.5 16-Apr-2025	Soil	GSoil300	Hold Cold HM + Asbestos PA
18	45564-TP18_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold HM
19	45564-TP18_0.3 16-Apr-2025	Soil	GSoil300	Hold Cold
20	45564-TP19_0.1 16-Apr-2025	Soil	GSoil300	Hold Cold HM
21	45564-TP19_0.3 16-Apr-2025	Soil	GSoil300	Hold Cold

TP01-0.05 16.4.24 Soil HM
 TP02-0.1 HM
 TP06-0.1 HM
 TP07-0.1 HM
 SS01-0.1 HM
 SS03-0.1 HM

Certificate of Analysis

Page 1 of 4

Client:	Davis Ogilvie & Partners Limited	Lab No:	3862435	SPV1
Contact:	Julian Washington	Date Received:	17-Apr-2025	
	C/- Davis Ogilvie & Partners Limited	Date Reported:	30-Apr-2025	
	PO Box 589	Quote No:	82763	
	Addington	Order No:		
	Christchurch 8140	Client Reference:	45564	
		Submitted By:	Julian Washington	

Sample Type: Soil

Sample Name:	45564-TP08_0.1 16-Apr-2025 3:00 pm	45564-TP11_0.1 16-Apr-2025	45564-TP14_0.1 16-Apr-2025	45564-TP14B 16-Apr-2025	45564-TP16_0.1 16-Apr-2025
Lab Number:	3862435.1	3862435.3	3862435.9	3862435.11	3862435.14

Individual Tests

Dry Matter	g/100g as rcvd	81	93	80	71	-
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Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	8	2	< 2	4	< 2
Total Recoverable Cadmium	mg/kg dry wt	0.11	< 0.10	< 0.10	< 0.2	0.12
Total Recoverable Chromium	mg/kg dry wt	16	11	7	24	7
Total Recoverable Copper	mg/kg dry wt	18	9	6	1,080	7
Total Recoverable Lead	mg/kg dry wt	15.2	11.3	14.4	33	15.8
Total Recoverable Nickel	mg/kg dry wt	4	8	4	15	4
Total Recoverable Zinc	mg/kg dry wt	40	37	18	1,970	15

Asbestos in Soil

As Received Weight Presence / Absence Testing	g	-	-	-	-	127.5
Dry Weight Presence / Absence Testing	g	-	-	-	-	104.7
<2mm Subsample Weight Presence / Absence Testing	g dry wt	-	-	-	-	51.9
Asbestos Presence / Absence from Presence / Absence Testing		-	-	-	-	Asbestos NOT detected.
Description of Asbestos Form Presence / Absence Testing		-	-	-	-	-

Asbestos in Soil Presence / Absence Testing ESdat Electronic Transfer

Amosite Presence / Absence Testing	Detect	-	-	-	-	0
Chrysotile Presence / Absence Testing	Detect	-	-	-	-	0
Crocidolite Presence / Absence Testing	Detect	-	-	-	-	0

BTEX in Soil by Headspace GC-MS

Benzene	mg/kg dry wt	-	-	< 0.05	-	-
Toluene	mg/kg dry wt	-	-	0.38	-	-
Ethylbenzene	mg/kg dry wt	-	-	< 0.05	-	-
m&p-Xylene	mg/kg dry wt	-	-	< 0.10	-	-
o-Xylene	mg/kg dry wt	-	-	< 0.05	-	-

Polycyclic Aromatic Hydrocarbons Screening in Soil*

Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	< 0.3	< 0.3	2.9	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.048	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.114	-
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.019	-
Acenaphthene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	< 0.014	-
Anthracene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	< 0.14 #1	-
Benzo[a]anthracene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.125	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.083	-

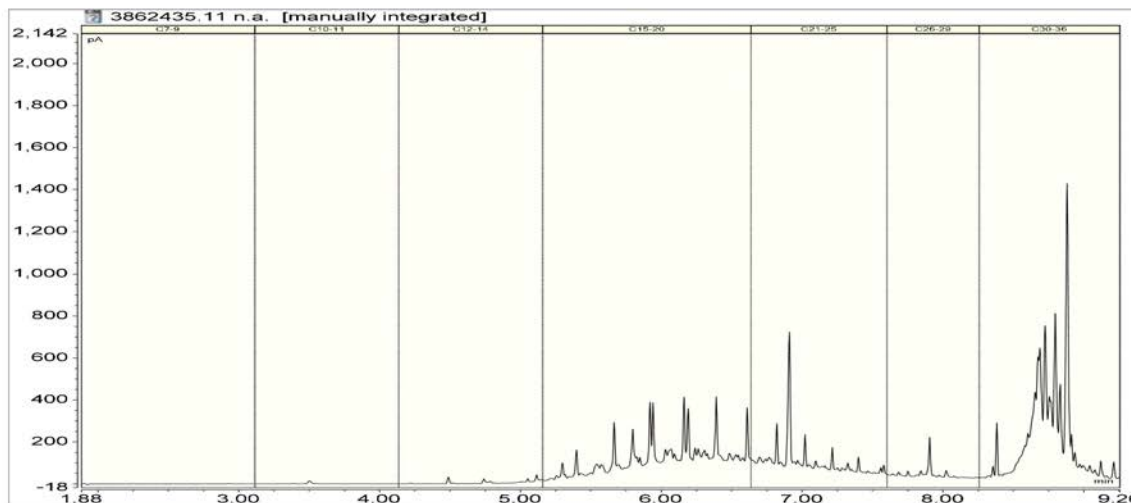


This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported 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:		45564-TP08_0.1 16-Apr-2025 3:00 pm	45564-TP11_0.1 16-Apr-2025	45564-TP14_0.1 16-Apr-2025	45564-TP14B 16-Apr-2025	45564-TP16_0.1 16-Apr-2025
Lab Number:		3862435.1	3862435.3	3862435.9	3862435.11	3862435.14
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.030	< 0.026	< 0.030	0.135	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.029	< 0.026	< 0.030	0.132	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.126	-
Benzo[e]pyrene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.077	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.069	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.035	-
Chrysene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.135	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.014	-
Fluoranthene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.30	-
Fluorene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.71	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.042	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.06	< 0.07	0.15	-
Perylene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.014	-
Phenanthrene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.41	-
Pyrene	mg/kg dry wt	< 0.013	< 0.011	< 0.013	0.44	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	< 20	< 20	< 20	-
C10 - C14	mg/kg dry wt	-	< 20	< 20	460	-
C15 - C36	mg/kg dry wt	-	< 40	< 40	40,000	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	< 80	< 80	40,000	-
Sample Name:		45564-TP17_0.5 16-Apr-2025	45564-TP18_0.1 16-Apr-2025	45564-TP19_0.1 16-Apr-2025	45564-TP01_0.05 16-Apr-2025	45564-TP02_0.1 16-Apr-2025
Lab Number:		3862435.17	3862435.18	3862435.20	3862435.22	3862435.23
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	2	3	< 2	2	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	0.11	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	9	10	7	9	10
Total Recoverable Copper	mg/kg dry wt	9	8	6	6	8
Total Recoverable Lead	mg/kg dry wt	16.6	8.6	14.9	10.7	11.8
Total Recoverable Nickel	mg/kg dry wt	4	8	4	5	6
Total Recoverable Zinc	mg/kg dry wt	25	39	15	31	38
Asbestos in Soil						
As Received Weight Presence / Absence Testing	g	141.2	-	-	-	-
Dry Weight Presence / Absence Testing	g	114.5	-	-	-	-
<2mm Subsample Weight Presence / Absence Testing	g dry wt	34.8	-	-	-	-
Asbestos Presence / Absence from Presence / Absence Testing		Asbestos NOT detected.	-	-	-	-
Description of Asbestos Form Presence / Absence Testing		-	-	-	-	-
Asbestos in Soil Presence / Absence Testing ESdat Electronic Transfer						
Amosite Presence / Absence Testing	Detect	0	-	-	-	-
Chrysotile Presence / Absence Testing	Detect	0	-	-	-	-
Crocidolite Presence / Absence Testing	Detect	0	-	-	-	-
Sample Name:		45564-TP06_0.1 16-Apr-2025	45564-TP07_0.1 16-Apr-2025	45564-SS01_0.1 16-Apr-2025	45564-SS03_0.1 16-Apr-2025	
Lab Number:		3862435.24	3862435.25	3862435.26	3862435.27	
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 2	2	< 2	< 2	
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	0.11	< 0.10	
Total Recoverable Chromium	mg/kg dry wt	8	10	9	9	
Total Recoverable Copper	mg/kg dry wt	8	7	6	7	

Sample Type: Soil				
Sample Name:		45564-TP06_0.1 16-Apr-2025	45564-TP07_0.1 16-Apr-2025	45564-SS01_0.1 16-Apr-2025
Lab Number:		3862435.24	3862435.25	3862435.26
Heavy Metals, Screen Level				
Total Recoverable Lead	mg/kg dry wt	13.1	11.7	11.3
Total Recoverable Nickel	mg/kg dry wt	4	6	5
Total Recoverable Zinc	mg/kg dry wt	26	32	30

3862435.11
45564-TP14B 16-Apr-2025
Client Chromatogram for TPH by FID



Analyst's Comments

#1 Due to some interference found in the chromatography, the detection limit was raised. Hence the higher detection limit reported.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1, 3, 9, 11, 14, 17-18, 20, 22-27
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1, 3, 9, 11
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1, 3, 9, 11
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	1, 3, 9, 11
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	1, 3, 9, 11

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	3, 11
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, 9, 11, 14, 17-18, 20, 22-27
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	9
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1, 9
Asbestos in Soil			
As Received Weight Presence / Absence Testing	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	14, 17
Dry Weight Presence / Absence Testing	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	14, 17
<2mm Subsample Weight Presence / Absence Testing	Sample dried at 100 to 105°C, weight of <2mm sample fraction taken for asbestos identification if less than entire fraction. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	-	14, 17
Asbestos Presence / Absence from Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	14, 17
Description of Asbestos Form Presence / Absence Testing	Description of asbestos form and/or shape if present.	-	14, 17
Asbestos in Soil Presence / Absence Testing ESdat Electronic Transfer			
Amosite Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Presence / Absence testing.	0 Detect	14, 17
Chrysotile Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Presence / Absence testing.	0 Detect	14, 17
Crocidolite Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Presence / Absence testing.	0 Detect	14, 17
Total Petroleum Hydrocarbons in Soil			
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.	-	11
C7 - C9	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3, 9, 11
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3, 9, 11
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	3, 9, 11
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	3, 9, 11

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

Testing was completed between 23-Apr-2025 and 30-Apr-2025. For completion dates of individual analyses please contact the laboratory.

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

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



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

Certificate of Analysis

Page 1 of 5

Client:	Davis Ogilvie & Partners Limited	Lab No:	3862435	SUPV1
Contact:	Julian Washington	Date Received:	17-Apr-2025	
	C/- Davis Ogilvie & Partners Limited	Date Reported:	30-Apr-2025	
	PO Box 589	Quote No:	82763	
	Addington	Order No:		
	Christchurch 8140	Client Reference:	45564	
		Submitted By:	Julian Washington	

Sample Type: Soil

Sample Name:	45564-TP08_0.1 16-Apr-2025 3:00 pm	45564-TP11_0.1 16-Apr-2025	45564-TP14_0.1 16-Apr-2025	45564-TP14B 16-Apr-2025
Lab Number:	3862435.1	3862435.3	3862435.9	3862435.11

Individual Tests

Dry Matter	g/100g as rcvd	81.1 ± 5.0	93.0 ± 5.0	80.4 ± 5.0	70.9 ± 5.0
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Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	7.9 ± 1.8	2.2 ± 1.4	< 2 ± 1.4	4.0 ± 1.5
Total Recoverable Cadmium	mg/kg dry wt	0.112 ± 0.068	< 0.10 ± 0.067	< 0.10 ± 0.067	< 0.2 ± 0.071
Total Recoverable Chromium	mg/kg dry wt	16.0 ± 2.8	11.3 ± 2.2	6.9 ± 1.7	24.0 ± 4.0
Total Recoverable Copper	mg/kg dry wt	18.5 ± 2.9	9.0 ± 1.8	6.2 ± 1.6	1,080 ± 150
Total Recoverable Lead	mg/kg dry wt	15.2 ± 2.3	11.3 ± 1.8	14.4 ± 2.2	33.4 ± 5.0
Total Recoverable Nickel	mg/kg dry wt	4.1 ± 1.5	7.5 ± 1.7	3.5 ± 1.4	14.6 ± 2.3
Total Recoverable Zinc	mg/kg dry wt	40.3 ± 3.9	36.9 ± 3.8	17.7 ± 3.0	1,970 ± 140

BTEX in Soil by Headspace GC-MS

Benzene	mg/kg dry wt	-	-	< 0.05 ± 0.024	-
Toluene	mg/kg dry wt	-	-	0.379 ± 0.036	-
Ethylbenzene	mg/kg dry wt	-	-	< 0.05 ± 0.015	-
m&p-Xylene	mg/kg dry wt	-	-	< 0.10 ± 0.038	-
o-Xylene	mg/kg dry wt	-	-	< 0.05 ± 0.026	-

Polycyclic Aromatic Hydrocarbons Screening in Soil*

Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	< 0.3	< 0.3	2.9
1-Methylnaphthalene	mg/kg dry wt	< 0.013 ± 0.032	< 0.011 ± 0.032	< 0.013 ± 0.032	0.048 ± 0.034
2-Methylnaphthalene	mg/kg dry wt	< 0.013 ± 0.032	< 0.011 ± 0.032	< 0.013 ± 0.032	0.114 ± 0.042
Acenaphthylene	mg/kg dry wt	< 0.013 ± 0.0067	< 0.011 ± 0.0067	< 0.013 ± 0.0067	0.0192 ± 0.0069
Acenaphthene	mg/kg dry wt	< 0.013 ± 0.0070	< 0.011 ± 0.0068	< 0.013 ± 0.0070	< 0.014 ± 0.0072
Anthracene	mg/kg dry wt	< 0.013 ± 0.0071	< 0.011 ± 0.0069	< 0.013 ± 0.0071	< 0.14 ± 0.043 #1
Benzo[a]anthracene	mg/kg dry wt	< 0.013 ± 0.0070	< 0.011 ± 0.0068	< 0.013 ± 0.0070	0.125 ± 0.034
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013 ± 0.0067	< 0.011 ± 0.0067	< 0.013 ± 0.0067	0.0832 ± 0.0092
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.030 ± 0.0097	< 0.026 ± 0.0096	< 0.030 ± 0.0097	0.135 ± 0.013
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.029 ± 0.0097	< 0.026 ± 0.0096	< 0.030 ± 0.0097	0.132 ± 0.013
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.013 ± 0.0069	< 0.011 ± 0.0068	< 0.013 ± 0.0069	0.126 ± 0.027
Benzo[e]pyrene	mg/kg dry wt	< 0.013 ± 0.0067	< 0.011 ± 0.0067	< 0.013 ± 0.0067	0.0772 ± 0.0089
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013 ± 0.0068	< 0.011 ± 0.0067	< 0.013 ± 0.0068	0.069 ± 0.014
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013 ± 0.0068	< 0.011 ± 0.0068	< 0.013 ± 0.0068	0.0352 ± 0.0080
Chrysene	mg/kg dry wt	< 0.013 ± 0.0069	< 0.011 ± 0.0068	< 0.013 ± 0.0069	0.135 ± 0.022
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013 ± 0.0068	< 0.011 ± 0.0068	< 0.013 ± 0.0068	0.0144 ± 0.0069
Fluoranthene	mg/kg dry wt	< 0.013 ± 0.0068	< 0.011 ± 0.0067	< 0.013 ± 0.0068	0.302 ± 0.031
Fluorene	mg/kg dry wt	< 0.013 ± 0.0068	< 0.011 ± 0.0068	< 0.013 ± 0.0068	0.711 ± 0.085
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013 ± 0.0067	< 0.011 ± 0.0067	< 0.013 ± 0.0067	0.0415 ± 0.0077

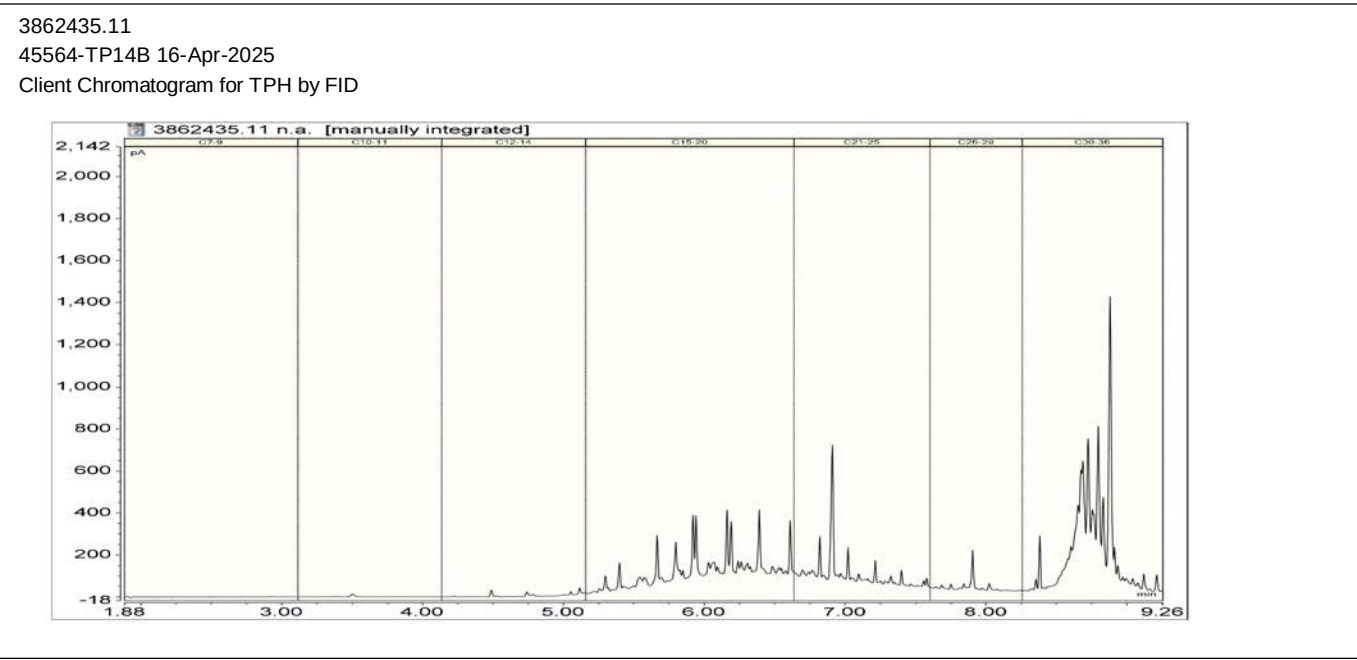


This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported 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:		45564-TP08_0.1 16-Apr-2025 3:00 pm	45564-TP11_0.1 16-Apr-2025	45564-TP14_0.1 16-Apr-2025	45564-TP14B 16-Apr-2025
Lab Number:		3862435.1	3862435.3	3862435.9	3862435.11
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Naphthalene	mg/kg dry wt	< 0.07 ± 0.035	< 0.06 ± 0.034	< 0.07 ± 0.035	0.154 ± 0.049
Perylene	mg/kg dry wt	< 0.013 ± 0.0067	< 0.011 ± 0.0067	< 0.013 ± 0.0067	0.0140 ± 0.0067
Phenanthrene	mg/kg dry wt	< 0.013 ± 0.0069	< 0.011 ± 0.0068	< 0.013 ± 0.0069	0.407 ± 0.058
Pyrene	mg/kg dry wt	< 0.013 ± 0.0068	< 0.011 ± 0.0068	< 0.013 ± 0.0068	0.437 ± 0.057
Total Petroleum Hydrocarbons in Soil					
C7 - C9	mg/kg dry wt	-	< 20 ± 6.7	< 20 ± 6.7	< 20 ± 6.7
C10 - C14	mg/kg dry wt	-	< 20 ± 7.6	< 20 ± 7.6	461 ± 90
C15 - C36	mg/kg dry wt	-	< 40 ± 9.3	< 40 ± 9.3	39,500 ± 3,700
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	< 80 ± 14	< 80 ± 14	40,000 ± 3,700
Sample Name:		45564-TP16_0.1 16-Apr-2025	45564-TP17_0.5 16-Apr-2025	45564-TP18_0.1 16-Apr-2025	45564-TP19_0.1 16-Apr-2025
Lab Number:		3862435.14	3862435.17	3862435.18	3862435.20
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.4	2.0 ± 1.4	3.1 ± 1.4	< 2 ± 1.4
Total Recoverable Cadmium	mg/kg dry wt	0.123 ± 0.068	< 0.10 ± 0.067	< 0.10 ± 0.067	0.109 ± 0.067
Total Recoverable Chromium	mg/kg dry wt	7.2 ± 1.8	8.7 ± 1.9	10.4 ± 2.1	6.9 ± 1.7
Total Recoverable Copper	mg/kg dry wt	6.5 ± 1.6	8.6 ± 1.8	8.5 ± 1.8	6.3 ± 1.6
Total Recoverable Lead	mg/kg dry wt	15.8 ± 2.4	16.6 ± 2.5	8.6 ± 1.4	14.9 ± 2.3
Total Recoverable Nickel	mg/kg dry wt	4.0 ± 1.5	4.4 ± 1.5	8.2 ± 1.7	3.7 ± 1.4
Total Recoverable Zinc	mg/kg dry wt	15.1 ± 2.9	24.6 ± 3.2	39.3 ± 3.9	14.9 ± 2.9
Asbestos in Soil					
As Received Weight Presence / Absence Testing	g	127.5	141.2	-	-
Dry Weight Presence / Absence Testing	g	104.7	114.5	-	-
<2mm Subsample Weight Presence / Absence Testing	g dry wt	51.9	34.8	-	-
Asbestos Presence / Absence from Presence / Absence Testing		Asbestos NOT detected.	Asbestos NOT detected.	-	-
Description of Asbestos Form Presence / Absence Testing		-	-	-	-
Asbestos in Soil Presence / Absence Testing ESdat Electronic Transfer					
Amosite Presence / Absence Testing	Detect	0	0	-	-
Chrysotile Presence / Absence Testing	Detect	0	0	-	-
Crocidolite Presence / Absence Testing	Detect	0	0	-	-
Sample Name:		45564-TP01_0.05 16-Apr-2025	45564-TP02_0.1 16-Apr-2025	45564-TP06_0.1 16-Apr-2025	45564-TP07_0.1 16-Apr-2025
Lab Number:		3862435.22	3862435.23	3862435.24	3862435.25
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	2.2 ± 1.4	< 2 ± 1.4	< 2 ± 1.4	2.3 ± 1.4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.067	< 0.10 ± 0.067	< 0.10 ± 0.067	< 0.10 ± 0.067
Total Recoverable Chromium	mg/kg dry wt	9.5 ± 2.0	9.7 ± 2.0	7.9 ± 1.8	10.0 ± 2.1
Total Recoverable Copper	mg/kg dry wt	6.5 ± 1.6	7.9 ± 1.7	7.6 ± 1.7	7.4 ± 1.7
Total Recoverable Lead	mg/kg dry wt	10.7 ± 1.7	11.8 ± 1.8	13.1 ± 2.0	11.7 ± 1.8
Total Recoverable Nickel	mg/kg dry wt	4.7 ± 1.5	5.9 ± 1.6	4.3 ± 1.5	5.9 ± 1.6
Total Recoverable Zinc	mg/kg dry wt	30.8 ± 3.5	37.7 ± 3.8	26.4 ± 3.3	32.0 ± 3.5
Sample Name:		45564-SS01_0.1 16-Apr-2025		45564-SS03_0.1 16-Apr-2025	
Lab Number:		3862435.26		3862435.27	
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.4		< 2 ± 1.4	
Total Recoverable Cadmium	mg/kg dry wt	0.112 ± 0.068		< 0.10 ± 0.067	
Total Recoverable Chromium	mg/kg dry wt	9.0 ± 2.0		8.8 ± 1.9	
Total Recoverable Copper	mg/kg dry wt	6.5 ± 1.6		6.9 ± 1.7	
Total Recoverable Lead	mg/kg dry wt	11.3 ± 1.8		11.1 ± 1.7	
Total Recoverable Nickel	mg/kg dry wt	4.7 ± 1.5		5.1 ± 1.5	
Total Recoverable Zinc	mg/kg dry wt	29.7 ± 3.4		31.2 ± 3.5	

The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling.

For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website: www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.



The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling.

For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website: www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.

Analyst's Comments

#1 Due to some interference found in the chromatography, the detection limit was raised. Hence the higher detection limit reported.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1, 3, 9, 11, 14, 17-18, 20, 22-27
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1, 3, 9, 11
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1, 3, 9, 11
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from: Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	1, 3, 9, 11

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	1, 3, 9, 11
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	3, 11
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, 9, 11, 14, 17-18, 20, 22-27
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	9
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1, 9
Asbestos in Soil			
As Received Weight Presence / Absence Testing	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	14, 17
Dry Weight Presence / Absence Testing	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	14, 17
<2mm Subsample Weight Presence / Absence Testing	Sample dried at 100 to 105°C, weight of <2mm sample fraction taken for asbestos identification if less than entire fraction. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	-	14, 17
Asbestos Presence / Absence from Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	14, 17
Description of Asbestos Form Presence / Absence Testing	Description of asbestos form and/or shape if present.	-	14, 17
Asbestos in Soil Presence / Absence Testing ESdat Electronic Transfer			
Amosite Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Presence / Absence testing.	0 Detect	14, 17
Chrysotile Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Presence / Absence testing.	0 Detect	14, 17
Crocidolite Presence / Absence Testing	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Presence / Absence testing.	0 Detect	14, 17
Total Petroleum Hydrocarbons in Soil			
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.	-	11
C7 - C9	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3, 9, 11
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3, 9, 11
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	3, 9, 11
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	3, 9, 11

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

Testing was completed between 23-Apr-2025 and 30-Apr-2025. For completion dates of individual analyses please contact the laboratory.

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

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

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

Certificate of Analysis

Page 1 of 3

Client:	Davis Ogilvie & Partners Limited	Lab No:	3940368	SPv1
Contact:	Gareth Oddy	Date Received:	17-Jul-2025	
	C/- Davis Ogilvie & Partners Limited	Date Reported:	22-Jul-2025	
	PO Box 589	Quote No:	82763	
	Addington	Order No:		
	Christchurch 8140	Client Reference:	45564	
		Submitted By:	Lizzie Wilkinson	

Sample Type: Soil						
Sample Name:		SS01_WD	SS02_WD	SS03_WD	SS04_WD	SS05_WD
		16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025
Lab Number:		3940368.1	3940368.2	3940368.3	3940368.4	3940368.5
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	67	63	60
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	2	< 2	< 2	< 2	3
Total Recoverable Cadmium	mg/kg dry wt	0.14	0.18	0.15	0.20	0.17
Total Recoverable Chromium	mg/kg dry wt	9	7	7	8	10
Total Recoverable Copper	mg/kg dry wt	24	8	9	8	27
Total Recoverable Lead	mg/kg dry wt	15.9	10.9	11.3	11.5	17.7
Total Recoverable Nickel	mg/kg dry wt	5	4	4	4	5
Total Recoverable Zinc	mg/kg dry wt	59	38	114	120	111
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	< 0.4	< 0.4	< 0.4
1-Methylnaphthalene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
2-Methylnaphthalene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Acenaphthylene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Acenaphthene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Anthracene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Benzo[a]anthracene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	< 0.035	< 0.037	< 0.039
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	< 0.035	< 0.037	< 0.039
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Benzo[e]pyrene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Benzo[k]fluoranthene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Chrysene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Fluoranthene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Fluorene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Naphthalene	mg/kg dry wt	-	-	< 0.08	< 0.08	< 0.08
Perylene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Phenanthrene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016
Pyrene	mg/kg dry wt	-	-	< 0.015	< 0.016	< 0.016



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:		SS01_WD 16-Jul-2025	SS02_WD 16-Jul-2025	SS03_WD 16-Jul-2025	SS04_WD 16-Jul-2025	SS05_WD 16-Jul-2025
Lab Number:		3940368.1	3940368.2	3940368.3	3940368.4	3940368.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	< 30	< 30	< 30
C10 - C14	mg/kg dry wt	-	-	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	-	-	< 40	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	< 90	< 90	< 90

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	3-5
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	3-5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from: Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	3-5
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from: Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	3-5
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	3-5
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	1-5
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3-5
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3-5
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	3-5
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	3-5

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

Testing was completed between 18-Jul-2025 and 22-Jul-2025. For completion dates of individual analyses please contact the laboratory.

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

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A handwritten signature in blue ink, consisting of several overlapping loops and a long horizontal stroke extending to the right.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 3

Client:	Davis Ogilvie & Partners Limited	Lab No:	3940368	SUPV1
Contact:	Gareth Oddy	Date Received:	17-Jul-2025	
	C/- Davis Ogilvie & Partners Limited	Date Reported:	22-Jul-2025	
	PO Box 589	Quote No:	82763	
	Addington	Order No:		
	Christchurch 8140	Client Reference:	45564	
		Submitted By:	Lizzie Wilkinson	

Sample Type: Soil

Sample Name:		SS01_WD 16-Jul-2025	SS02_WD 16-Jul-2025	SS03_WD 16-Jul-2025	SS04_WD 16-Jul-2025
Lab Number:		3940368.1	3940368.2	3940368.3	3940368.4
Individual Tests					
Dry Matter	g/100g as rcvd	-	-	66.8 ± 5.0	63.0 ± 5.0
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	2.1 ± 1.4	< 2 ± 1.4	< 2 ± 1.4	< 2 ± 1.4
Total Recoverable Cadmium	mg/kg dry wt	0.138 ± 0.068	0.183 ± 0.070	0.150 ± 0.069	0.203 ± 0.071
Total Recoverable Chromium	mg/kg dry wt	9.2 ± 2.0	7.0 ± 1.7	7.4 ± 1.8	8.3 ± 1.9
Total Recoverable Copper	mg/kg dry wt	23.8 ± 3.5	8.2 ± 1.8	8.9 ± 1.8	8.4 ± 1.8
Total Recoverable Lead	mg/kg dry wt	15.9 ± 2.4	10.9 ± 1.7	11.3 ± 1.8	11.5 ± 1.8
Total Recoverable Nickel	mg/kg dry wt	5.3 ± 1.5	3.6 ± 1.4	3.7 ± 1.4	4.2 ± 1.5
Total Recoverable Zinc	mg/kg dry wt	59.5 ± 5.0	37.8 ± 3.8	114.2 ± 8.5	119.6 ± 8.9
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	< 0.4	< 0.4
1-Methylnaphthalene	mg/kg dry wt	-	-	< 0.015 ± 0.032	< 0.016 ± 0.032
2-Methylnaphthalene	mg/kg dry wt	-	-	< 0.015 ± 0.032	< 0.016 ± 0.032
Acenaphthylene	mg/kg dry wt	-	-	< 0.015 ± 0.0068	< 0.016 ± 0.0068
Acenaphthene	mg/kg dry wt	-	-	< 0.015 ± 0.0073	< 0.016 ± 0.0074
Anthracene	mg/kg dry wt	-	-	< 0.015 ± 0.0075	< 0.016 ± 0.0076
Benzo[a]anthracene	mg/kg dry wt	-	-	< 0.015 ± 0.0073	< 0.016 ± 0.0074
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	< 0.015 ± 0.0067	< 0.016 ± 0.0067
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	< 0.035 ± 0.0097	< 0.037 ± 0.0098
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	< 0.035 ± 0.0097	< 0.037 ± 0.0098
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	< 0.015 ± 0.0071	< 0.016 ± 0.0072
Benzo[e]pyrene	mg/kg dry wt	-	-	< 0.015 ± 0.0067	< 0.016 ± 0.0067
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	< 0.015 ± 0.0069	< 0.016 ± 0.0070
Benzo[k]fluoranthene	mg/kg dry wt	-	-	< 0.015 ± 0.0069	< 0.016 ± 0.0069
Chrysene	mg/kg dry wt	-	-	< 0.015 ± 0.0070	< 0.016 ± 0.0070
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	< 0.015 ± 0.0069	< 0.016 ± 0.0069
Fluoranthene	mg/kg dry wt	-	-	< 0.015 ± 0.0068	< 0.016 ± 0.0068
Fluorene	mg/kg dry wt	-	-	< 0.015 ± 0.0069	< 0.016 ± 0.0069
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	< 0.015 ± 0.0068	< 0.016 ± 0.0068
Naphthalene	mg/kg dry wt	-	-	< 0.08 ± 0.036	< 0.08 ± 0.037
Perylene	mg/kg dry wt	-	-	< 0.015 ± 0.0067	< 0.016 ± 0.0067
Phenanthrene	mg/kg dry wt	-	-	< 0.015 ± 0.0070	< 0.016 ± 0.0070
Pyrene	mg/kg dry wt	-	-	< 0.015 ± 0.0069	< 0.016 ± 0.0069



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Sample Type: Soil					
Sample Name:		SS01_WD 16-Jul-2025	SS02_WD 16-Jul-2025	SS03_WD 16-Jul-2025	SS04_WD 16-Jul-2025
Lab Number:		3940368.1	3940368.2	3940368.3	3940368.4
Total Petroleum Hydrocarbons in Soil					
C7 - C9	mg/kg dry wt	-	-	< 30 ± 6.8	< 30 ± 6.9
C10 - C14	mg/kg dry wt	-	-	< 20 ± 7.7	< 20 ± 7.7
C15 - C36	mg/kg dry wt	-	-	< 40 ± 9.5	< 40 ± 9.4
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	< 90 ± 14	< 90 ± 14
Sample Name:		SS05_WD 16-Jul-2025			
Lab Number:		3940368.5			
Individual Tests					
Dry Matter	g/100g as rcvd	60.3 ± 5.0			
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	2.9 ± 1.4			
Total Recoverable Cadmium	mg/kg dry wt	0.166 ± 0.070			
Total Recoverable Chromium	mg/kg dry wt	9.9 ± 2.1			
Total Recoverable Copper	mg/kg dry wt	26.7 ± 3.9			
Total Recoverable Lead	mg/kg dry wt	17.7 ± 2.7			
Total Recoverable Nickel	mg/kg dry wt	5.4 ± 1.5			
Total Recoverable Zinc	mg/kg dry wt	111.3 ± 8.3			
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4			
1-Methylnaphthalene	mg/kg dry wt	< 0.016 ± 0.032			
2-Methylnaphthalene	mg/kg dry wt	< 0.016 ± 0.032			
Acenaphthylene	mg/kg dry wt	< 0.016 ± 0.0068			
Acenaphthene	mg/kg dry wt	< 0.016 ± 0.0076			
Anthracene	mg/kg dry wt	< 0.016 ± 0.0078			
Benzo[a]anthracene	mg/kg dry wt	< 0.016 ± 0.0075			
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.016 ± 0.0068			
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.039 ± 0.0098			
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.039 ± 0.0098			
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.016 ± 0.0072			
Benzo[e]pyrene	mg/kg dry wt	< 0.016 ± 0.0068			
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.016 ± 0.0070			
Benzo[k]fluoranthene	mg/kg dry wt	< 0.016 ± 0.0070			
Chrysene	mg/kg dry wt	< 0.016 ± 0.0071			
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.016 ± 0.0070			
Fluoranthene	mg/kg dry wt	< 0.016 ± 0.0068			
Fluorene	mg/kg dry wt	< 0.016 ± 0.0069			
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.016 ± 0.0068			
Naphthalene	mg/kg dry wt	< 0.08 ± 0.037			
Perylene	mg/kg dry wt	< 0.016 ± 0.0068			
Phenanthrene	mg/kg dry wt	< 0.016 ± 0.0070			
Pyrene	mg/kg dry wt	< 0.016 ± 0.0070			
Total Petroleum Hydrocarbons in Soil					
C7 - C9	mg/kg dry wt	< 30 ± 7.1			
C10 - C14	mg/kg dry wt	< 20 ± 7.8			
C15 - C36	mg/kg dry wt	< 40 ± 9.5			
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 90 ± 15			

The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling.

For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website: www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	3-5
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	3-5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	3-5
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	3-5
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	3-5
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	1-5
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3-5
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	3-5
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	3-5
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	3-5

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

Testing was completed between 18-Jul-2025 and 22-Jul-2025. For completion dates of individual analyses please contact the laboratory.

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

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

Ara Heron BSc (Tech)
Client Services Manager - Environmental

XRF Results

	45564 - Washdyke Seadown Drain									Tier 1 Assessment Criteria		
Sample Name	45564_SS01_0.1	45564_SS01_0.1	45564_SS02_0.1	45564_SS02_0.1	45564_SS03_0.1	45564_SS03_0.1	45564_SS04_0.1	45564_SS04_0.1	45564_SS04_0.1	Background Concentrations (mg/kg)	Australian and New Zealand Guidelines for Fresh and Marine Water Quality - Sediment GV-high (mg/kg)	NES SCSs 1 for Protection of Human Health based on a Rural Residential (25% produce) land use (mg/kg)
Date Collected	16-Apr-25											
Sample depth (m bgl)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Heavy Metals (mg/kg dry weight)												
Arsenic	4	3	3	3	3	3	<LOD	4	5	11.0	70	17
Cadmium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.28	10	0.8
Chromium	33	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	33	19.3	370	290
Copper	10	8	13	12	6	8	11	14	8	16.4	270	>10,000
Lead	13	12	13	14	13	12	17	15	14	19.30	220	160
Nickel	9	<LOD	<LOD	<LOD	<LOD	<LOD	12	<LOD	11	16.1	52	400
Zinc	39	32	38	37	32	35	47	49	53	77.1	410	7,400
Sample Name	45564_SS05_0.1	45564_SS05_0.1	45564_SS06_0.1	45564_SS06_0.1	45564_SS06_0.1	45564_SS07_0.1	45564_SS07_0.1	45564_SS08_0.1	45564_SS08_0.1			
Date Collected	16-Apr-25											
Sample depth (m bgl)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Arsenic	3	2	4	4	4	3	2	2	3	11.0	70	17
Cadmium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.28	10	0.8
Chromium	62	44	46	<LOD	51	<LOD	<LOD	<LOD	<LOD	19.3	370	290
Copper	9	6	11	10	10	5	5	11	8	16.4	270	>10,000
Lead	10	11	12	12	13	13	13	13	14	19.30	220	160
Nickel	10	16	9	9	6	<LOD	<LOD	<LOD	8	16.1	52	400
Zinc	46	44	36	36	34	29	30	40	37	77.1	410	7,400
Sample Name	45564_SS09_0.1	45564_SS09_0.1	45564_SS09_0.1	45564_TP01_0.05	45564_TP01_0.05	45564_TP01_0.1	45564_TP01_0.1	45564_TP01_0.5	45564_TP01_0.5			
Date Collected	16-Apr-25											
Sample depth (m bgl)	0.1	0.1	0.1	0.05	0.05	0.1	0.1	0.5	0.5			
Arsenic	3	5	4	16	17	3	3	4	3	11.0	70	17
Cadmium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.28	10	0.8
Chromium	<LOD	<LOD	36	<LOD	49	30	50	45	39	19.3	370	290
Copper	10	10	10	12	11	5	7	5	9	16.4	270	>10,000
Lead	15	12	15	15	14	11	13	11	12	19.30	220	160
Nickel	<LOD	<LOD	<LOD	<LOD	<LOD	11	8	8	13	16.1	52	400
Zinc	40	43	40	41	43	40	39	38	40	77.1	410	7,400
Sample Name	45564_TP02_0.1	45564_TP02_0.1	45564_TP02_0.5	45564_TP02_0.5	45564_TP02_0.5	45564_TP03_0.1	45564_TP03_0.1	45564_TP03_0.5	45564_TP03_0.5			
Date Collected	16-Apr-25											
Sample depth (m bgl)	0.1	0.1	0.5	0.5	0.5	0.1	0.1	0.5	0.5			
Arsenic	4	3	4	4	3	3	3	3	3	11.0	70	17
Cadmium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.28	10	0.8
Chromium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	40	19.3	370	290
Copper	13	10	9	9	8	9	6	12	6	16.4	270	>10,000
Lead	15	15	15	14	12	12	12	13	13	19.30	220	160
Nickel	<LOD	9	11	11	14	10	<LOD	12	13	16.1	52	400
Zinc	50	46	50	50	46	44	40	50	47	77.1	410	7,400
Sample Name	45564_TP03_0.5	45564_TP04_0.1	45564_TP04_0.1	45564_TP04_0.1	45564_TP04_0.5	45564_TP04_0.5	45564_TP05_0.1	45564_TP05_0.1	45564_TP05_0.5			
Date Collected	16-Apr-25											
Sample depth (m bgl)	0.5	0.1	0.1	0.1	0.5	0.5	0.1	0.1	0.5			
Arsenic	3	4	3	3	3	4	3	2	3	11.0	70	17
Cadmium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.28	10	0.8
Chromium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	34	19.3	370	290
Copper	8	9	10	11	14	12	7	8	8	16.4	270	>10,000
Lead	11	16	16	16	18	16	12	12	12	19.30	220	160
Nickel	11	<LOD	<LOD	<LOD	11	7	<LOD	<LOD	14	16.1	52	400
Zinc	46	43	43	45	42	42	41	43	42	77.1	410	7,400
Sample Name	45564_TP05_0.5	45564_TP06_0.1	45564_TP06_0.1	45564_TP06_0.5	45564_TP06_0.5	45564_TP07_0.1	45564_TP07_0.1	45564_TP07_0.1	45564_TP07_0.1			
Date Collected	16-Apr-25											
Sample depth (m bgl)	0.5	0.1	0.1	0.5	0.5	0.1	0.1	0.1	0.1			
Arsenic	4	4	3	2	<LOD	3	4	3	2	11.0	70	17
Cadmium	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.28	10	0.8
Chromium	43	<LOD	<LOD	<LOD	<LOD	<LOD	47	35	<LOD	19.3	370	290
Copper	10	10	11	8	8	8	8	8	8	16.4	270	>10,000
Lead	12	17	17	16	17	15	12	14	14	19.30	220	160
Nickel	<LOD	10	7	7	<LOD	<LOD	15	17	<LOD	16.1	52	400
Zinc	45	40	38	38	41	38	40	40	35	77.1	410	7,400
Sample Name	45564_TP07_0.3	45564_TP07_0.3										
Date Collected	16-Apr-25											
Sample depth (m bgl)	0.3	0.3										
Arsenic	2	<LOD								11.0	70	17
Cadmium	<LOD	<LOD								0.28	10	0.8
Chromium	38	<LOD								19.3	370	290
Copper	8	9								16.4	270	>10,000
Lead	13	13								19.30	220	160
Nickel	<LOD	<LOD								16.1	52	400
Zinc	30	31								77.1	410	7,400

			BTEX				
			Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Module 4, Tier 1 Commercial / Industrial (SAND)			3	94	180		
Lab Report Number	Field ID	Date					
3862435	45564-TP14_0.1	16 Apr 2025	<0.05	0.38	<0.05	<0.10	<0.05

			Metals						
			Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Nickel	Zinc
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ECan Canterbury Regional Background (Gley)			11	0.28	19.3	16.43	19.3	16.1	77.1
NESCS Soil Contaminant Standards - Comm/Ind Outdoor Worker (Unpaved) [meta]			70	1,300	6,300	10,000	3,300	6,000	400,000
NESCS Soil Contaminant Standards - Recreation [meta]			80	400	2,700	10,000	880	1,200	30,000
NESCS Soil Contaminant Standards - Residential 10% Produce [meta]			20	3	460	10,000	210	400	7,400
ANZG Toxicant Default Guideline Values for Sediment Quality - GV - High			70	10	370	270	220	52	410
Lab Report Number	Field ID	Date							
3818338	R2_7m_0.05	05 Mar 2025	6	0.11	11	185	5,500	6	76
3818338	R2_Bund Wall	05 Mar 2025	20	0.30	9	230	14,200	6	112
3818338	R3_0.05	05 Mar 2025	<2	0.13	10	18	260	6	34
3818338	R04_0.1m	05 Mar 2025	2	<0.10	10	6	12.8	6	39
3818338	R4_0.05	05 Mar 2025	2	<0.10	11	7	31	7	38
3818338	R4_Bund Wall	05 Mar 2025	2	<0.10	10	15	240	5	34
3818338	Swale Sediment	05 Mar 2025	31	0.34	12	48	570	8	130
3862435	45564-SS01_0.1	16 Apr 2025	<2	0.11	9	6	11.3	5	30
3862435	45564-SS03_0.1	16 Apr 2025	<2	<0.10	9	7	11.1	5	31
3862435	45564-TP01_0.05	16 Apr 2025	2	<0.10	9	6	10.7	5	31
3862435	45564-TP02_0.1	16 Apr 2025	<2	<0.10	10	8	11.8	6	38
3862435	45564-TP06_0.1	16 Apr 2025	<2	<0.10	8	8	13.1	4	26
3862435	45564-TP07_0.1	16 Apr 2025	2	<0.10	10	7	11.7	6	32
3862435	45564-TP08_0.1	16 Apr 2025	8	0.11	16	18	15.2	4	40
3862435	45564-TP11_0.1	16 Apr 2025	2	<0.10	11	9	11.3	8	37
3862435	45564-TP14_0.1	16 Apr 2025	<2	<0.10	7	6	14.4	4	18
3862435	45564-TP14B	16 Apr 2025	4	<0.2	24	1,080	33	15	1,970
3862435	45564-TP16_0.1	16 Apr 2025	<2	0.12	7	7	15.8	4	15
3862435	45564-TP17_0.5	16 Apr 2025	2	<0.10	9	9	16.6	4	25
3862435	45564-TP18_0.1	16 Apr 2025	3	<0.10	10	8	8.6	8	39
3862435	45564-TP19_0.1	16 Apr 2025	<2	0.11	7	6	14.9	4	15
3940368	SS01_WD	16 Jul 2025	2	0.14	9	24	15.9	5	59
3940368	SS02_WD	16 Jul 2025	<2	0.18	7	8	10.9	4	38
3940368	SS03_WD	16 Jul 2025	<2	0.15	7	9	11.3	4	114
3940368	SS04_WD	16 Jul 2025	<2	0.20	8	8	11.5	4	120
3940368	SS05_WD	16 Jul 2025	3	0.17	10	27	17.7	5	111

[illegible]

	pH	Metals						
		Arsenic	Cadmium	Chromium (III+VI) ¹	Copper	Lead	Nickel ²	Zinc ²
	pH units	mg / L						
ANZG Freshwater Toxicant DGVs LOSP 80%		0.36	0.0008	0.04	0.0025	0.0094	0.017	0.031
ANZG Freshwater Toxicant DGVs LOSP 95%		0.024	0.0002	0.001	0.0014	0.0034	0.011	0.008
Class 1		5	1	5	5	5	10	10
Class 2		1	0.2	1	0.5	1	1	1

Lab Report No.		Field ID							
3818338.7	R2_7m_0.05 [SPLP Extract]	7.8	0.0062	< 0.000053	0.0016	0.043	1.02	0.00102	0.0155

Environmental Standards

ANZG, ANZG Toxicant Default Guideline Values for Sediment Quality - DGV
WasteMINZ (2023) Technical guidelines for disposal to land

			TPH			
			C15-C36 Fraction	C7-C36 Fraction	C7-C9 Fraction	C10-C14 Fraction
			mg/kg	mg/kg	mg/kg	mg/kg
Module 4, Tier 1 Commercial / Industrial (SAND)					120	1,500
Lab Report Number	Field ID	Date				
3862435	45564-TP11_0.1	16 Apr 2025	<40	<80	<20	<20
3862435	45564-TP14_0.1	16 Apr 2025	<40	<80	<20	<20
3862435	45564-TP14B	16 Apr 2025	40,000	40,000	<20	460
3940368	SS03_WD	16 Jul 2025	<40	<90	<30	<20
3940368	SS04_WD	16 Jul 2025	<40	<90	<30	<20
3940368	SS05_WD	16 Jul 2025	<40	<90	<30	<20