REPORT

Tonkin+Taylor

Healthy Waters - Te Ararata Flood Resilience Works - Walmsley Road Bridge Replacement

Blue Green Network: Walmsley Road Bridge

Prepared for
Auckland City Council
Prepared by
Tonkin & Taylor Ltd
Date
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September 2024	0	Preliminary Site Investigation Report for submission to Council.	C. Thornton	L. Phuah	C. Bauld
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1 Introduction

Tonkin & Taylor Ltd (T+T) has been engaged by Auckland Council's Healthy Waters department (Healthy Waters) to undertake a Preliminary Site Investigation (PSI) for the proposed Te Ararata Walmsley Road bridge replacement works (the Project). The Project is flood resilience works, with this assessment prepared to support a resource consent application under the Severe Weather Emergency Recovery (Auckland Flood Resilience Works) Order 2024. The Project site is located at Black Bridge Reserve (hereafter referred to as 'the site'), as shown on Figure 1.1.

This report assesses the construction and operational Contaminated Land effects of the Project based on an indicative construction methodology and concept design developed to support the resource consent application.

A reasonable worst case and effects envelope has been assumed within this assessment to account for potential changes to activities and programme. Minor changes to the final methodology and detailed design are unlikely to change the overall envelope of effects as presented in this report.

This report has been prepared in general accordance with the requirements for a PSI referred to in the National Environmental Standard for assessing and managing Contamination in Soil (NESCS) regulations[1] and as outlined in the Ministry for Environment's (MfE's) Contaminated Land Management Guidelines (CLMG) No.1[2].

The persons undertaking, managing, reviewing, and certifying this investigation are suitably qualified and experienced practitioners (SQEP), as defined in the NESCS Soil User's Guide[3].

This report has been prepared in accordance with our Statement of Work (SoW) dated 14 June 2024[4].

1.1 Project background

The January 2023 floods, followed closely by Cyclone Gabrielle, marked a period of unprecedented weather challenges for Auckland. The floods, and the subsequent cyclone caused significant infrastructural damage, with an estimated 8,000 homes destroyed or damaged and thousands of residents' lives affected. The events underscored the city's vulnerability to extreme weather, prompting Auckland Council to endorse the "Making Space for Water Programme" developed by Healthy Waters. This initiative aims to mitigate flood risks through a series of blue-green networks, addressing critical flood-prone areas with sustainable stormwater solutions.

As part of the overall Programme, Healthy Waters identified a combination of interventions within the Te Ararata catchment (overall referred to as the Te Ararata Project) to collectively address the flood resilience issues further outlined in the Assessment of Effects on the Environment (AEE).

1.2 Proposed development

The first package of works within the overall Te Ararata Project is for the Walmsley Road bridge replacement works (i.e. the Project) and is the subject of this assessment. The Project seeks to

[1] Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.
[2] Ministry for the Environment, updated 2021, Contaminated land management guidelines *No. 1: Reporting on Contaminated Sites in New Zealand.*
[3] Ministry for the Environment. 2012. *Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.* Wellington: Ministry for the Environment
[4] T+T (2024). Statement of Work (SoW). Te Ararata Stage 2: Design. Stream works. Contract number CW218687. Auckland Council.

achieve greater flow capacity and reduce blockage risk beneath Walsmley Road and within Te Ararata Creek.

A detailed description of the proposed work and indicative methodology is provided in the AEE prepared for the application. The Project is located within the existing Walmsley Road bridge, Te Ararata Creek, Black Bridge Reserve and Walmsley Road Reserve (refer to Appendix A). Overall construction of the Project is anticipated to take approximately 10 – 12 months, with closure of the existing Walmsley Road bridge required for approximately 7 months during this period.

In summary, the Project includes the following key elements:

- Demolition and removal of the existing Walmsley Road twin culvert.
- Construction of a new replacement Walmsley Road bridge over Te Ararata Creek.
- Works to tie in the new replacement bridge with the existing road network.
- Recontouring of the stream banks under the bridge to achieve a wider stream channel.
- Relocation of the existing Watercare watermain pipe bridge foundations to achieve a wider clearance beneath the structure.
- Existing service relocation and/or realignment.
- Vegetation clearance, including within riparian margins and the removal of trees.
- Earthworks associated with temporary and permanent works, including within the riparian margins.
- Other temporary works and activities to facilitate the construction of the permanent Project including:
  - The formation and operation of laydown areas and a site compound predominantly within Black Bridge Reserve.
  - Works within and around the Te Ararata Creek including temporary stream diversion.
  - Temporary traffic management measures including a temporary bailey bridge to facilitate pedestrian and active mode diversions between Coronation Road and Walmsley Road. Vehicular traffic will be diverted to the wider existing road network.

1.3 Objective and scope of work

The objective of this investigation is to identify activities at the site which may have resulted in ground contamination, assess the likelihood and potential magnitude of ground contamination (if any) and the likely regulatory implications for the proposed development works.

The scope of work comprised the following elements:

- Review historical aerial photographs for the site made available by Auckland Council, Retrolens and Google Earth Pro.
- Review of a Site Contamination Enquiry (SCE) and Council records of pollution incidents.
- Undertake a brief site walkover to assess current land use conditions.
- Laboratory analysis of soil samples collected from geotechnical investigations for:
  - Heavy metals.
  - Polycyclic aromatic hydrocarbons (PAHs).
  - Total petroleum hydrocarbons (TPH).
  - Asbestos - semi-quantitative analysis.
- Assessment of the sampling results and observations against relevant criteria for human health, environment, and soil disposal options.

- Preparation of this report outlining the findings and comments on the potential for ground contamination at the site, in the context of the proposed development, including potential resource consent implications with regard to ground contamination.

Approx Scale 1:500

0 5 10 15 20 25(m)

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Auckland Council

Blue Green Network

Walmsley Road Bridge

FIG. No. Figure 1.1 – Site Layout

REV. 0

2 Site description

2.1 Site location and identification

The site comprises a section of Black Bridge Reserve to the north, Walmsley Road to the south, and Te Ararata Creek beyond. Further site identification information is presented below in Table 2.1 below.

Table 2.1: Property identification information

Street address	5R Walmsley Road
Legal description	Portion of PT ALLOT 31 SBRS OF Mangere, LOT 12 DP 45822, PT ALLOT 309 PSH OF Manurewa, and LOT 3 DP 35540
Zoning[5]	Open Space – Information Recreation Zone, and Open Space – Conservation Zone
Area	7,200 m^2
Current use	Public open space

2.2 Surrounding land use

The land immediately surrounding the site is zoned as 'Residential - Mixed Housing Urban Zone' to the south, 'Residential - Mixed Housing Suburban Area' to the north and east, and 'Special Purpose Zone' to the west. The surrounding land uses are detailed below.

- North – Public reserve (Black Bridge Reserve), with residential housing beyond.
- South – Walmsley Road and residential housing beyond.
- East – Public reserve (Walmsley Road Reserve), with residential housing and horticultural landuse (at least 50 m away) beyond.
- West – Coronation Road, BP service station, Siasi Tokaikolo 'ia Kalaisi - 'Api ko Nasaleti Church. and OneSchool Global Auckland Campus beyond.

2.3 Site condition

A T+T representative completed a site walkover inspection on 29 August 2024. The purpose of the site inspection was to gather general information on topography, land use proximal to the site and in areas surrounding, as well as making observations for evidence of potential ground contamination. Relevant observations made at the time of the inspection are summarised below, and selected photos are included in Appendix B.

The northern area of the site comprises Black Bridge Reserve which largely contains a well-maintained grassed area, and includes a number of trees and a 2 m wide paved walkway. The topography of the site gently slopes east towards Te Ararata Creek. The creek bank area is covered by vegetation and is mostly inaccessible.

A water pipeline was observed traversing the site, just north of Walmsley Road. This pipeline runs below ground across the majority of the site, although it is visible above ground as it crosses Te Ararata Creek.

[5] Auckland Council Unitary Plan Operative in Part (16 Nove 2016). Accessed from: Unitary Plan Operative in part (aucklandcouncil.govt.nz).

In the southern portion of the site, grass clippings and scattered household refuse is visible in the banks of the Te Ararata Creek.

There was no evidence of spills, staining or hazardous materials observed during the site walkover.

2.4 Geology

Published geological information (Figure 2.1) indicate that the site is underlain by lithic tuff of the Auckland Basalts formation. These sediments predominantly consist of pre-volcanic materials with basaltic fragments, and unconsolidated ash and lapilli deposits of the Kerikeri Volcanic group. A geologic boundary lies close to the south of the site, where the area to the south is underlain by clastic Holocene River deposits comprising sand, silts, mud and clay of the Tauranga group.

Figure 2.1: Published geological map in relation to the project area (Source T+T Map Viewer[6]).

2.5 Site specific ground model

The soil profile obtained from the geotechnical investigation[7] conducted concurrently with this ground contamination investigation is shown in Table 2.2. Further description of the site soils is contained within the T+T geotechnical report.

[6] T+T Map Viewer. Retrieved August 8, 2024, from T+T Map Viewer (tonkinandtaylorgroup.com).
[7] T+T, September 2024, *Te Ararata – Walmsley Road Bridge Upgrade – Geotechnical assessment report.* Report prepared for Auckland Council. Reference: 1017033.2003.vA.

Table 2.2: Summary of subsurface ground conditions around the Walmsley Road bridge

Geological unit	Soil description	Typical elevation of surface of layer (mRL)	Typical depth to surface of layer (mbgl)	Typical layer thickness (m)
Topsoil[1]	Dark brown firm SILT.	-	0	0.1 – 0.3
Fill	Dark greyish brown stiff SILT with some gravel or cobbles.	6.3 – 6.6	0 - 0.1	1.2 - 3.7
Auckland Volcanic Field	Slightly weathered BASALT[2] (western abutment) or stiff to very stiff SILT (eastern abutment).	5.4 – 5.5	0.3 -1.2	1.7 - 3.3
Takaanini Formation	Dark grey firm to very stiff clayey or silty SILT with lens of organic clay.	2.1 – 5.4	1.5 – 4.5	5.4 – 8
	Dark grey silty SAND or sandy SILT, generally medium dense or very stiff to hard, occasionally interbedded with loose or firm lens.	-2.4 - -3.5	9 – 10.5	–5 - 8.2
	Dark grey stiff to hard SILT, interbedded with medium dense silty sand.	-8.2 – -11.7	14 – 18.3	5 – 8
	Dark grey dense to very dense SAND.	-16.2 - -17.1	22 - 24	> 10

[1] Topsoil was only encountered at BH02 & HA01 which are located within the Reserves.
[2] Basalt was only encountered at BH01 which is located to the northwestern corner of the bridge, whilst fill material is directly overlying Takaanini formation at borehole located to the southeastern corner.

2.6 Hydrogeology and hydrology

Both surface and groundwater beneath the site are expected to follow ground topography and flow in an easterly direction towards Te Ararata Creek, ultimately discharging into the Mangere inlet, approximately 300 m east of the site. Portions of the site are located on flood plains/flood prone areas.

Based on Auckland Council Maps[5] groundwater in the area is part of the Manukau North Waitemata aquifer.

Groundwater was encountered in two boreholes and one hand auger advanced as part of the geotechnical investigation[8]. Depth to water ranged from +2.1 to 4.0 mRL. It should be noted that water levels recorded from hand augers (without screening) in saturated soils can appear higher than the actual levels.

[8] T+T, September 2024, *Te Ararata – Walmsley Road Bridge Upgrade - Geotechnical Assessment Report.* Prepared for Auckland Council, Ref: 1017033.2003 vA.

3 Historical review

Historical information relating to the site has been collected from a variety of sources including the historic aerial photographs, AC SCE, and Council provided information. This history focuses on onsite activities, except for the aerial photograph review where comments are also provided on readily observable surrounding land use. The information reviewed is summarised in the following sections, further details are provided in Appendix C and Appendix E.

3.1 Historical aerial photographs

The site is located in Mangere and is surrounded by a mixture of residential and commercial / industrial land. Based on a review of the historical aerial imagery, the current site configuration has been largely in place since at least circa 1940. There is evidence of some filling in the centre of site north of Walmsley Road. Construction occurred in the southwestern portion of the site in 1975 associated with adding an extra lane to the intersection of Walmsley Road and Coronation Road, and again in or around the 1980s for the installation of a water pipeline across the banks of Te Ararata Creek, north of Walmsley Road.

3.2 Auckland Council Site Contamination Enquiry

There are no records of contamination information held within Council's records for the eastern portion of the site on Walmsley Road Reserve.

However, the western portion of the site is located on the southern portion of Black Bridge Reserve which is indicated as a historic closed landfill. AC GIS records indicate that only the northern part of Black Bridge Reserve is considered a HAIL (refer Figure in Appendix D). The landfill has historically received cleanfill, municipal waste and green waste and is listed as having a low gas generation potential by AC. No other known landfills are located within 200 m of the site.

As such HAIL Item (G3) – Landfill sites may be applicable to the site.

Council records within 200 m of the site indicated a HAIL activity is listed at 152 Coronation Road, approximately 50 m northwest of the site. The HAIL refers to a BP petrol station which is located upgradient to the northwest. There is a change of 1 mRL from the boundary of the site and the BP petrol station.

3.3 Previous reports

The following section provides a summary of the previous investigations undertaken within the vicinity of the site, and will be used in assessing the potential for contamination at the site.

3.3.1 Drill Logs for Hills Road, Ngati-Otara, Old Quarry Road, Elm Park and Whitford Bridge Landfill Sites (GroundSearch, 1995)

In 1995, GroundSearch drilling was completed at Old Quarry Road, Mangere[9]. Prodill drilled 12 boreholes and recorded gas readings during drilling. Borehole BH1 and BH2, advanced within the boundary of the site, did not encounter any fill materials or abnormal gas readings. Underlying geology consisted of topsoil followed by fresh basalt. Building rubble and clay fill was encountered in BH7 through BH12 to the north, which is outside of the site boundary. The site plan is shown in Figure 3.1.

[9] GroundSearch EES Ltd, December 1995, *Drill Logs for Hills Road, Ngati-Otara, Old Quarry Road, Elm Park and Whitford Bridge Landfill Sites.*

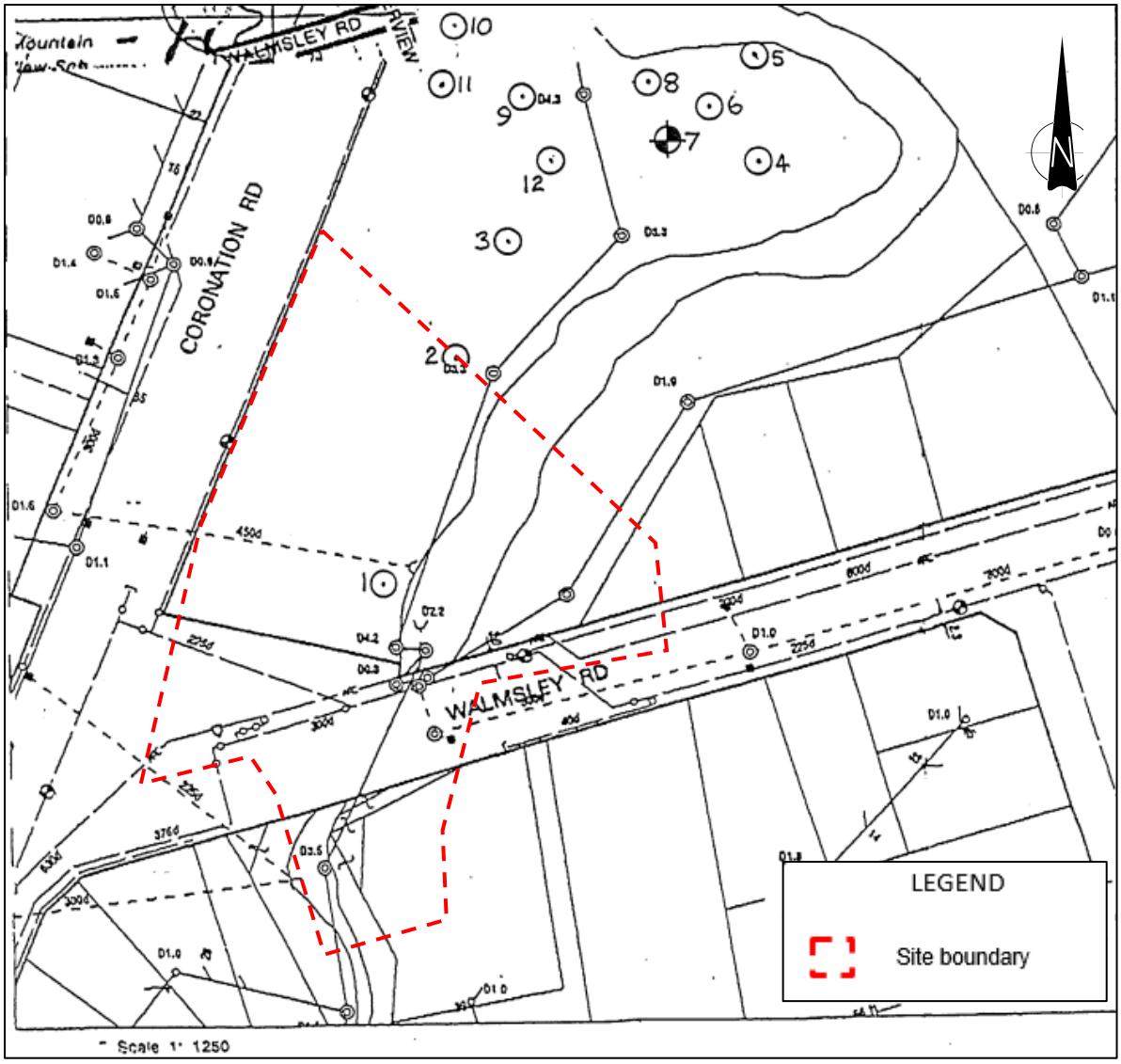


Figure 3.1: Locations of previous investigations (Source: GroundSearch, 1995).

3.3.2 Walmsley Bulk Supply Point Bypass Design – Preliminary Site Investigation (WSP, 2023)

In 2023 WSP New Zealand Limited (WSP) undertook a PSI[10] with limited soil sampling at Black Bridge Reserve, Mangere. The northern portion of Black Bridge Reserve is listed by AC as a closed landfill and therefore falls within the MFE HAIL Category G3 – Landfill sites.

A review of the available information found no evidence of the site being used for landfill activities. However, it should be noted that the WSP investigation was limited to a 20 m^2 area in the road reserve along Walmsley Road. The site plan is shown in Figure 3.2.

[10] WSP, 1 May 2023, *Walmsley Bulk Supply Point Bypass Design – Preliminary Site Investigation*. Report prepared for Watercare Services Ltd.

Figure 3.2: Site layout (Source, WSP, 2023).

4 Potential for contamination

Based on the review of readily available site history information, there are a number of activities associated with previous site uses that have the potential to have caused ground contamination. Potentially contaminating activities identified for the site are presented in Table 4.1 along with an assessment of the likelihood, potential magnitude and possible extent of contamination resulting from past activities.

Table 4.1: Potential for contamination

Land use / activity	Potential contaminants	Likelihood, magnitude and possible extent of contamination	HAIL reference
Onsite			
Black Bridge Historic Landfill	Landfill gas, metals, hydrocarbons, sulfate, ammonia, nitrate, nitrite in groundwater	Black Bridge Reserve has been identified as a historic closed landfill. The main area of landfilling is indicated by historical aerials to likely be confined to the north of the reserve, marked as the HAIL area on the AC SCE, and not on the site. This landfill has been listed as having a low gas generation potential by AC. Historic borehole logs advanced by GroundSearch drilling investigation in 1995 did not encounter any abnormal gas readings in the two boreholes advanced at the site. Building rubble and clay fill was encountered in BH7 through BH12 to the north, which is outside of the site boundary to the north of the site.	More likely than not HAIL Item G3 (Landfill sites) does not apply.
Filling during site development	Variable depending on the source, but heavy metals, PAH, and asbestos containing materials (ACM) are common.	Historical aerials indicate some filling has occurred at the site in circa 1975. Historic borehole logs advanced by GroundSearch drilling investigation in 1995 did not encounter any fill materials in the two boreholes advanced at the site. Geotechnical borehole logs advanced during the 2024 investigations indicated that fill materials consisting of steel waste was encountered in BH01, to a depth of 1.2 m, north of Walmsley Road. This area is associated with WSPs investigation in 2023, therefore the materials is most likely associated with works undertaken following the investigation. Fill materials were also encountered in BH02 to a depth of 2.2. Fill materials consisted of silt with some boulders. No obvious indications of contamination (odour, discoloration or demolition type material) were reported.	More likely than not HAIL Activity I (if contaminants are present at concentrations that pose a risk to human health or the environment) does not apply.
Offsite			
Service station at 152	Metals, hydrocarbons including BTEX, TPH and PAH	Council files indicate that a BP petrol station is located approximately 50 m northwest of the site. The Council SCE did not identify that a	More likely than not potentially Activity H (Migration from

Land use / activity	Potential contaminants	Likelihood, magnitude and possible extent of contamination	HAIL reference
Coronation Road,		significant spill has occurred at the service station. We infer that this property is hydraulically cross gradient of the site, therefore potential groundwater contamination emanating from these properties is considered unlikely to affect the subject site.	adjacent land in sufficient quantity that it could be a risk to human health or the environment) does not apply.

5 Intrusive investigation

5.1 Investigation rationale

Soil samples were collected from geotechnical boreholes drilled at the site on 21 through 26 August 2024. The sampling targeted fill material and was undertaken primarily to provide information for soil disposal purposes.

Soil samples were collected from hand augers taken in machine borehole locations BH01 and BH02. The investigations were restricted to geotechnical investigation and undertaken before concept design plans were made available. The sample locations are presented below in Figure 5.1.

5.2 Sampling and laboratory analysis

In total four soil samples of fill material were collected and submitted for metals, PAH, TPH, and asbestos (semi-quantitative analysis). Soil samples were collected in general accordance with the MfE's CLMG No. 5[11] and the New Zealand Asbestos in Soils Guidelines[12] according to the following procedure:

- Samples were collected directly from the hand trowel / hand auger. Decontamination procedures were in place to avoid cross-contamination.
- Recovered material was visually inspected for the presence of suspected ACM fragments or visual indications of contamination e.g. staining, odour.
- The materials encountered were logged in general accordance with the NZ Geotechnical Society "*Guidelines for the classification and field description of soils and rocks for engineering purposes"*.
- Samples were collected using fresh gloves and placed into laboratory approved containers – 300 ml glass jars for chemical analyses, and 500 ml plastic sample containers for asbestos testing.
- Any non-dedicated/non-disposable equipment used to collect the samples was decontaminated between sample locations using a scrubbing brush with clean water and Decon 90 (a phosphate-free detergent).
- The samples were stored under chilled conditions prior to being sent via courier under chain of custody (CoC) documentation to Hill Laboratories, an IANZ-accredited laboratory.
- Samples were selected for analysis based on field observation, with additional samples held in cold storage at the laboratory for future analysis, if required.

[11] MfE, 2021b. Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2021). Wellington: Ministry for the Environment.
[12] Building Research Association of New Zealand (BRANZ), 2017, New Zealand Guidelines for Assessing and Managing Asbestos in Soil.

Figure 5.1: Soil sampling locations, BH01 and BH02.

5.3 Observations

The following observations were made during the site investigations, borehole logs are included in Appendix E:

- The site was generally overlain by a thin layer of topsoil consisting of clayey silt with some fine gravels, dark greyish brown, with some rootlets. Firm to stiff, moist, medium to high plasticity.
- Fill was observed at both locations. At BH01, fill was present to 1.2 mbgl, and consisted of clayey gravelly SILT with the inclusion steel waste at 0.4 and 0.6 mbgl. At BH02, there was a 1.7 m layer of fill which underlain the topsoil to 2.2 mbgl. This layer comprised of silty boulders with some gravels.
- Natural geology underlain the observed fill layers at both machine borehole locations, the site itself straddles geology strata change of Basalts from the Auckland Volcanic field and clayey SILT of the Takanini formation. At BH01 the natural underlying geology consisted of dark grey slightly to moderately weathered Basalt from the Auckland Volcanic field. Whilst at BH02, silty SAND and clayey SILT of the Takanini formation was encountered beneath the fill layer from 2.2 m bgl.
- No significant staining or odours or demolition material were observed in any of the soils sampled.

5.4 Assessment criteria

Soil testing results have been evaluated according to the requirements of the regulatory framework applicable to the site as follows:

- For the protection of human health:
  - The NESCS Soil contaminant standards (SCS) for commercial / industrial land use, a commercial / industrial (outdoor worker) / maintenance land use scenario; and the NESCS SCS for recreational use, a land use scenario covering the current use of the site as a reserve.
- Where NESCS SCS values were not provided, guidance from the following document was used, as per the MfE CLMG Guidelines No.2[13]:
  - MfE, 1999 (updated 2011), *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand.*
  - For asbestos in soil contamination, the criteria defined in the NZ Asbestos in Soil Guidelines[11].
- For discharges to the environment:
  - The Auckland Unitary Plan (AUP) Permitted Activity (PA) soil acceptance criteria[14].
  - The as specified in the "*Auckland Regional Council Technical Publication 153 – Background Concentrations of Inorganic Elements in Soils from the Auckland Region".* published background concentrations for volcanic soils in Auckland.
- For soil disposal:
  - Each disposal facility (cleanfill, managed fill and licensed landfill) has its own acceptance criteria. For initial assessment of materials, the results have been compared to the managed fill criteria for Ridge Road Quarry and the Auckland Council published background concentrations for acceptance of soil to cleanfill sites.

5.5 Results

The results from this investigation are presented below in Table 5.1 along with the relevant human health, environmental and background criteria. Laboratory transcripts from the investigations are presented in Appendix F.

Key findings from the analytical results are summarised below:

- Sample results were below the NESCS SCS for commercial / industrial land use and recreational land use, and the AUP PA criteria.
- No exceedances of the Auckland (volcanic) background criteria.
- Concentrations of PAHs in the samples analysed were reported above published background concentrations for volcanic soils in Auckland, but at concentrations below the relevant NESCS SCS and AUP PA criteria.
- Concentrations of TPHs were reported below the laboratory limited of reporting (LoR).
- No asbestos was detected in samples tested.

In summary, the testing confirms the preliminary site investigation findings and indicates that the site has not been subject to a HAIL activity.

[13] Ministry for the Environment, revised 2011. Contaminated land management guidelines No. 5: *Hierarchy and Application in New Zealand of Environmental Guideline Values.*

[14] Auckland Unitary Plan: Operative in Part Version (AUP), updated April 2022. Rule E30 Contaminated land

Table 5.1: Soil analytical results

					Asbestos[1]			Heavy Metals - Screen							Polycyclic Aromatic Hydrocarbons																		Total Petroleum Hydrcarbons (TPHs)			
					Asbestos Containing Material (ACM) (Presence / absence and type)	Asbestos Containing Material (ACM) (% w/w)	Fibrous asbestos (FA) / Asbestos fines (AF) (% w/w)	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	1-Methylnaphthalene	2-Methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	BaP equivalent	Benzo(a)anthracene	Benzo(a)pyrene (BAP)	Benzo(b)fluoranthene + Benzo(j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	C7 - C9	C10 - C14	C15 - C36	Total Hydrocarbons C7-C36
					-	%w/w	%w/w	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NESCS SCS - Commercial / Industrial[2]					**NA**	**0.05%**	**0.001%**	**70**	**1,300**	**>10,000**	**>10,000**	**3,300**	**6,000** [4]	**400,000** [4]	NA	NA	NA	NA	NA	**35**	refer BAPeq	refer BAPeq	refer BAPeq	NA	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	NA	refer BAPeq	**230** [4]	NA	NL [6]	**500**	**1,700**	NA	**1,700**
NESCS SCS - Recreational[2]					**NA**	**0.01%**	**0.001%**	**80**	**400**	**2,700**	**>10,000**	**880**	**800** [4]	**30,000** [4]	NA	NA	NA	NA	NA	**10**	refer BAPeq	refer BAPeq	refer BAPeq	NA	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	NA	refer BAPeq	**69** [4]	NA	**1,600** [4]	NA	NA	NA	NA
Auckland Unitary Plan Permitted activity criteria[3]					**NA**	**NA**	**NA**	**100**	**7.5**	**400**	**325**	**250**	**320***	**1160***	NA	NA	NA	NA	NA	**20**	refer BAPeq	refer BAPeq	refer BAPeq	NA	refer BAPeq	refer BAPeq	refer BAPeq	refer BAPeq	NA	refer BAPeq	**0.29** [7]	NA	**7.9** [7]	NA	NA	NA	NA
Auckland Background Concentrations (volcanic range)[5]					**NAD**	<LoR	<LoR	**0.4 - 12**	**<0.1 - 0.65**	**3- 125***	**20 - 90**	**<5 - 65**	**4 - 320**	**54 - 1,160**	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR	<LoR
Location	**Sample depth (m bgl)**	**Soil description**	**Material Type**	**Sampled Date**																																		
Walmsley Bridge	BH01	0.0-0.2	Gravelly SILT	26-Aug-24	Asbestos NOT Detected	<0.001	<0.001	5	0.19	48	33	43	50	84	< 0.014	< 0.014	< 0.014	< 0.014	0.018	0.41	0.104	0.128	0.15	0.096	0.052	0.102	0.018	0.24	< 0.014	0.091	< 0.07	0.072	0.24	< 20	< 20	< 40	< 80
		0.6-0.7	Fill - Steel waste	26-Aug-24	Asbestos NOT Detected	<0.001	<0.001	4	0.17	49	37	60	67	92	< 0.013	< 0.013	< 0.013	< 0.013	0.013	0.38	0.094	0.112	0.139	0.084	0.051	0.086	0.013	0.23	< 0.013	0.08	< 0.07	0.051	0.22	< 20	< 20	< 40	< 80
Walmsley Bridge	BH02	0.5-0.6	Gravelley SILT	22-Aug-24	Asbestos NOT Detected	<0.001	<0.001	4	0.19	51	35	48	62	92	< 0.014	< 0.014	0.026	< 0.014	0.064	1	0.25	0.32	0.36	0.21	0.124	0.25	0.036	0.59	0.017	0.196	< 0.07	0.24	0.6	< 20	< 20	< 40	< 80
		1.3-1.5	SILT	22-Aug-24	-	<0.001	<0.001	4	0.16	52	37	53	63	92	< 0.013	< 0.013	0.04	0.018	0.132	2.73	0.7	0.86	0.94	0.58	0.38	0.68	0.114	1.63	0.025	0.61	< 0.07	0.42	1.55	-	-	-	-

Comments

Results are in milligrams per kilogram (mg/kg) unless specified.

Results in grey are below the laboratory limit of reporting

'-' indicates not analysed or no relevant acceptance criteria

* Total Chromium

NA = Not applicable

<LoR - less than the laboratory limit of reporting

m bgl = meters below ground level

Values in grey are <LoR

NAD - No asbestos detected

1 = BRANZ Asbestos in Soil Guidelines soil guideline value for asbestos

2 = MfE, June 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health.

3 = Auckland Unitary Plan Operative in part E30 Contaminated Land. Permitted Activity Soil Criteria Table E30.6.1.4.1

4 = in the absence of available NESCS

5 = Auckland Regional Council, Technical Publication 153, October 2001. Background Concentrations of inorganic elements in soils from the Auckland Region: volcanic soils

6 = MfE, 2011. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Tier 1 soil acceptance criteria, surface (<1 m) contamination, all pathways.

7 = MfE, 2011. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Soil acceptance criteria for protection of groundwater quality, surface (<1 m) contamination, GW 2m (assumes contaminated soil in direct contact with groundwater)

8 = Landfill criteria may vary. Verify with landfill prior to disposal.

* Adjusted for volcanic background concentrations

BOLD : exceeded NES:CS SCS and AUP PA soil acceptance criteria

BOLD : exceeded one or more NES:CS SCS
BOLD : exceeded AUP PA soil acceptance criteria

above background concentrations

6 Conceptual site model

A conceptual site model as defined by the MfE in the CLMG[4], sets out known and potential sources of contamination, potential exposure pathways, and potential receptors. For there to be an effect, there has to be a contamination source and a mechanism (pathway) for contamination to affect human health or the environment (receptor).

A conceptual site model has been developed for the site which takes into account the available information about the site, and our understanding of the potential effects on human health and the environment resulting from the proposed works. The model is presented below.

The desk study indicates the potential **sources** of contamination that could impact the proposed works includes former filling during site development, refer Table 4.1. The key contaminants in fill, if any, are likely to be low level metals, petroleum hydrocarbons, and asbestos.

Receptors of identified contamination may include:

- People – construction workers doing excavation work, disposal site operators and the general public.
- Environment – flora and fauna of the Te Ararata Creek water courses in the vicinity of the site, and at disposal destinations.

The **pathways** by which the contamination sources can affect the receptors include:

- Direct contact to soil by investigation staff, people undertaking earthworks and future site users.
- Inhalation of contaminated dust by excavation workers and general public in the vicinity of the works.
- Migration via runoff during works to nearest receiving environment (Te Ararata Creek).
- Direct contact by the public offsite during any offsite transport / disposal of contaminated material.

In this instance no significant sources of contamination have been identified by this investigation so that the pathways by which the fill can affect people and the environment are incomplete both during and following development.

The implications for consenting and construction work are discussed in further detail in the following section.

7 Implications for the proposed development

7.1 Regulatory requirements

The rules and associated assessment criteria relating to the control of contaminated sites in the Auckland Region are specified in the following documents:

- The NESCS.
- The AUP – Operative in Part.
- Health and Safety at Work (Asbestos) Regulations 2016.

The NESCS regulations consider issues relating to land use and the protection of human health. The AUP has regard to issues relating to the protection of the general environment, including ecological receptors.

WorkSafe New Zealand has prepared an Approved Code of Practice (ACoP): Management and Removal of Asbestos (September 2016) to set out expectations about how to comply with the Asbestos Regulations. For management of asbestos in soils, the ACoP refers readers to the "New Zealand Guidelines for Assessing and Managing Asbestos in Soil" (herein referred to as the Asbestos-in-Soil Guidelines) which were published in November 2017 by BRANZ Ltd.

An assessment of the need, or otherwise, for ground contamination-related resource consents and asbestos requirements for the site redevelopment is provided in the following sections.

7.1.1 NESCS

7.1.1.1 Applicability

The NESCS came into effect on 1 January 2012. This legislation sets out nationally consistent planning controls appropriate to district and city councils for assessing contaminants in soil with regard to human health. As a result, the NESCS prevails over the rules in the District Plan, except where the rules permit or restrict effects that are not dealt with in the NESCS.

The NESCS applies to specific activities on land where a HAIL activity has, or is more likely than not to have occurred. Activities covered under the NESCS include soil disturbance, soil sampling, fuel systems removal, subdivision and land use change.

7.1.1.2 NESCS activity status

Based on multiple lines of evidence from the desktop review, T+T consider that it is more likely than not that a HAIL activity has not occurred on the site. On that basis, the NESCS does not apply and consent would not be required.

7.1.2 Activity under the Auckland Unitary Plan

The AUP (OP) was released on 15 November 2016. The contaminated land rules, set out in Chapter E: Environmental Risk Section E30, are not subject to any appeal, hence, the rules can now be 'treated as operative' under section 86F of the Resource Management Act 1991. Additionally, the provisions in the Auckland Council Regional Plan: Air Land and Water no longer need to be considered.

The contaminated land rules are set out in Chapter E Environmental Risk Section E30. To meet PA provisions:

- Small scale disturbance of a site can be undertaken as a PA subject to the controls in Rule E30.6.1.2 being complied with. The controls include advising Council prior to commencing the

work, implementing measures and controls to minimise discharges of contaminants to the environment, the land is not to contain separate phase liquid contaminants. There is a restriction on the volume of soil to be disturbed (200 m³ per site) and the duration of land disturbance (two months).

- Rule E30.6.1.4 states that if soil concentrations or the 95% upper confidence limit (UCL) of soil concentrations are below the PA criteria specified in Table E30.6.1.4.1 (or those set out in part b of Rule E30.6.1.4), then consent is not required under the contaminated land provisions of the Unitary Plan. If soil contaminant concentrations exceed these criteria, or separate phase liquid contaminants are present, then consent for disturbing the site, or for ongoing discharge of contaminants from it, is required.

The proposed development plans indicate that earthworks on the site are likely to exceed 200 m^3. However, soil testing shows soils samples meet the AUP PA criteria and does not contain elevated levels of contaminants. On this basis, we consider that consent is not required under the contamination land rules in Chapter E30 of the AUP.

7.1.3 Asbestos regulations

Asbestos was not detected in the samples analysed during the investigation and no evidence of ACM or other indicators of asbestos (e.g. demolition materials) was observed. On this basis, the Asbestos Regulations are not considered to apply to site redevelopment works at this time. Should evidence of asbestos contamination be encountered during earthworks, an assessment will be required to determine what controls are required in accordance with the requirements of the Asbestos Regulations.

7.2 Construction implications

Based on the site history and available sample results, the following are expected to apply during construction works:

- Earthworks controls in accordance with the T+T Erosion and Sediment Control Plan[15] and in general accordance with AC Erosion and Sediment Control Guide[16] are appropriate unless unexpected conditions are encountered during development work. Should unexpected contamination be encountered, the area should be covered, isolated and advice should be sought from a contaminated land specialist. This could be set out in the CMP for the project and implemented as necessary.
- Soil may remain onsite, however any fill requiring off-site disposal must be taken to a managed fill facility licensed to receive the material. Current rates for disposal vary around **$20 - $30 per tonne**[17] for managed fill.
- Natural underlying soil, if it can be separated from the overlying fill, should be able to be disposed to cleanfill, subject to approval by the cleanfill facility.

[15] T+T, September 2024, *Erosion and Sediment Control Plan: Walmsley Bridge – Harania Blue Green Networks Stage 2*. Report prepared for Auckland Council. Reference: 1017033.2003.v1.
[16] Auckland Council, 2016, *Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region.*
[17] Rates are indicative only at the time of writing and are not inclusive of excavation, transportation, contractor P&G and markup, escalation or GST.

8 Conclusions

T+T undertook a Preliminary Site Investigation of the Walmsley Road Bridge project site located at 5R Walmsley Road, Mangere to identify potential contamination sources through the site's history, and to assess the development and regulatory implications for future soil disturbance and/or land development activities.

The findings of the investigation can be summarised as follows:

- The site is located in Mangere and is surrounded by a mixture of residential and commercial / industrial land. The site comprises a section of Black Bridge Reserve to the north, Walmsley Road to the south, and Te Ararata Creek beyond.
- Based on a review of the historical aerial imagery, the current site configuration has been largely in place since at least circa 1940. There is evidence of some filling in the centre of site north of Walmsley Road. Construction occurred in the southwestern portion of the site in 1975 associated with adding an extra lane to the intersection of Walmsley Road and Coronation Road, and again in or around the 1980s for the installation of a water pipeline across the banks of Te Ararata Creek, north of Walmsley Road.
- A site walkover was undertaken on 29 August 2024. There was no evidence of spills, staining or hazardous materials observed during the site walkover.
- Historic borehole logs advanced by GroundSearch at Black Bridge Reserve in 1995, did not encounter any fill materials or abnormal gas readings in the two boreholes advanced at the site. Building rubble and clay fill was encountered in BH7 through BH12 to the north, which is outside of the site boundary.
- Geotechnical investigations undertaken at the site indicate some fill. No obvious indications of contaminants (odour, discoloration or demolition material) were encountered during the investigations.
- Based on multiple lines of evidence from the desktop review, T+T consider that it is more likely than not that a HAIL activity has not occurred on the site.
- Soil testing was carried out at the site in conjunction with geotechnical investigations primarily to provide information for soil disposal purposes. In summary, soil testing has shown that:
  - Contaminant concentrations are below both the NESCS SCS for commercial / industrial land use and recreation land use, and the AUP PA criteria. Therefore, the contamination identified does not present a risk to human health or the environment under the proposed development.
  - Soil samples collected from fill materials returned low concentrations of PAH. As a result, fill materials will need to be disposed of to a managed fill facility.
- The preliminary conceptual site model indicates that in this instance, no significant sources of contamination have been identified by this investigation so that the pathways by which the fill can affect people and the environment are incomplete both during and following development.
- The implications of these findings are:
  - Based on multiple lines of evidence from the desktop review, T+T consider that it is more likely than not that a HAIL activity has not occurred on the site. On that basis, the NESCS does not apply and consent would not be required.
  - Contaminant concentrations comply with the AUP permitted activity criteria therefore consent is not required under the contaminated land rules in Chapter E30 of the AUP.

- Soil may remain onsite, however excavated material disposed offsite must be taken to a managed fill facility licensed to receive the material based on the levels of contamination.
- Standard earthworks controls are appropriate for site works. Should unexpected contamination be encountered, the area should be covered, isolated and advice should be sought from a contaminated land specialist. This could be set out in the CMP for the project and implemented as necessary.

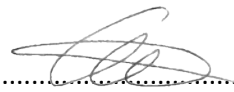
9 Applicability

This report has been prepared for the exclusive use of our client Auckland City Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:



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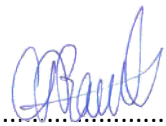
Carmen Thornton
Contaminated Land Consultant

Authorised for Tonkin & Taylor Ltd by:



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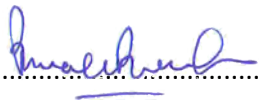
Chris Bauld
Project Director

Report certified by a suitably qualified and experienced practitioner as prescribed under the NESCS Users Guide (April 2012).



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Lean Phuah

Discipline Director

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Appendix A Development plans

PRINT IN COLOUR

NOT FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
D4	TP	23.10.24	UPDATED TEMPORARY FOOTPATH EXTENTS	TP
D3	TP	10.10.24	UPDATED BRIDGE AND STREAM WORK EXTENTS	TP
D2	TP	13.08.24	DETAILED CONCEPT	TP
D1	TP	17.07.24	CONCEPT FOR REVIEW	TP

A1 Original | Co-ordinate System: NZTM2000 | Datum: mCD | This sheet may be prepared using colour and may be incomplete if copied

SCALES
2 0 2 4 6 8m
1 : 200 FULL SIZE A1

DESIGNER
HEB construction together @ VINCI

CLIENT
Auckland Council
Te Kaunihera o Tāmaki Makaurau

DISCLAIMER *The information shown on this drawing is for the purposes of the Nominated Project Only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the Nominated Project.*

SERVICE PROVIDERS

DRAWN T.PERVAN
DESIGNED -
DRG CHECK -
DESIGN CHECK -
APPROVED -

TE ARARATA CULVERT REPLACEMENT

CONSTRUCTION SITE LAYOUT
ROAD CLOSED

STATUS: CONCEPT | SHEET 1 OF 1 | ©

DRG No TACR-HEB-01-00-DR-Z002 | REV D4

Appendix B Site photographs

Photograph Appendix B.1: Looking south towards Walmsley Road access. Photo shows the visible access points to the water pipeline which traverses the site.

Photograph Appendix B.2: Photo shows the site to the north, showing the Black Bridge reserve parcel of the site.

Photograph Appendix B.3: Photo shows the site to the south, with Te Ararata Creek.

Photograph Appendix B.4: View facing north of water pipeline.

Appendix C Site history

C1 Introduction

Historical information relating to the site has been collected from a variety of sources. The information presented documents on-site activities, except for the aerial photograph review where comments are also provided on readily observable surrounding land use. The information that has been reviewed is set out in this appendix.

C2 Site Contamination Enquiry

A contamination enquiry report was received from Auckland Council on the 21 August 2024. The information provided is included in Appendix D and summarised below:

- There are no records of contamination information held within Council's records for the site, Walmsley Road Reserve.
- Black Bridge Reserve itself is a historic closed landfill, this landfill has been listed as having a low gas generation potential by Auckland Council. No other known landfills are located within 200 m of the site.
- Within a 200 m radius of the site, there are:
  - Four sites registered with HAIL activities. The HAIL sites are shown in the plan provided by Auckland Council in Appendix D, Attachment A. For those sites with HAIL classifications most were associated with horticultural sites (35 Walmsley Road), and the historic use and/or storage of persistent pesticides. 35 Walmsley Road is upgradient of the site and is located 70 m northeast, the site has recently been re-developed into a high-density residential housing block. It is likely impacted soils have been removed as part of the re-development.
  - One further site, 152 Coronation Road is registered as a HAIL site for service station facilities. This BP petrol station is located upgradient, approximately 50 m northwest of the site, there is a change of 1 mRL from the boundary of our site and the petrol station.
  - One bore has been drilled in the area, the bore was constructed prior to 1987, for the Manukau County Council, for the Mangere Auxiliary water supply.
  - There are eight issued resource consents, of which three of these have been superseded, and two have been surrendered. Two of the issued consents pertain to NZ Transport Agency for a variation in consent, to divert and discharge stormwater at Onehunga Foreshore. One further consent is held by Auckland council to authorise the diversion and discharge of stormwater. One consent relates to wastewater, the discharge of wastewater to land from the BP forecourt.
  - One permitted activity (PA) is listed for property address, 134 Coronation Road, Mangere Bridge, Manukau, for contaminated site discharge as part of their residential redevelopment.

C3 Historical aerial photographic review

A review of the historical aerial photography sourced from Retrolens, Auckland City Council Geomaps[18], and Google Earth Pro was undertaken. Key findings are summarised in Table Appendix C.1.

Table Appendix C.1 : Summary of historical aerial photograph review

Year and source	Site observations	Surrounding land use	Imagery
1940 Auckland Council Geomaps	The site is largely in its present-day state; consisting of Te Ararata Creek which runs north to south through the. Walmsley to the south, Coronation Road to the west, and Black Bridge Reserve to the north and Walmsley Road Reserve to the east of the site.	Surrounding land mainly consists of life-style block parcels to the south and west, and horticulture land to the northeast and northwest of the site.	

[18] Auckland Council– Auckland Council Geomaps. Accessed 27 August 2024 from Auckland Council GeoMaps

Year and source	Site observations	Surrounding land use	Imagery
1959 Auckland Council Geomaps	No significant changes are evident	Further development of horticultural land and residential housing to the south of the site.	
1975 Retrolens	A road lane has been added to the intersection of Coronation and Walmsley Road which cuts through the southwestern corner of the site. No other significant changes were evident.	Further residential intensification has occurred on land to the south and west of the site. Development to the north remains sparse, with market gardens remaining in the northeast of the site.	

Year and source	Site observations	Surrounding land use	Imagery
1980 - 1981 Retrolens	The water pipeline has been installed across the banks of Te Ararata Creek, north of Walmsley Road. Soil disturbance is visible across Black Bridge Reserve, with a path which has been constructed running north to south through the reserve. Further channelization and riparian planting has occurred along Te Ararata Creek. Coronation Road has been widened.	Further residential intensification has occurred in the surrounding area. Market gardening still remains to the northeast and northwest of the site.	
1987 Retrolens	No significant changes to the site.	No significant changes to the area surrounding.	

Year and source	Site observations	Surrounding land use	Imagery
2001 Auckland Council Geomaps	Further trees have been planted in Black Bridge Reserve. No further changes to the site.	Development has occurred to the east and northeast areas of the site being; residential dwellings, a church, Pacific Christian School and large associated carparking area. A BP petrol station occupies previous market gardening land. Market gardening still remains to the northeast of the site.	
2008. Auckland Council Geomaps	No significant changes to the site.	No significant changes to surrounding area.	

Year and source	Site observations	Surrounding land use	Imagery
2015 and 2016 Auckland Council Geomaps	No significant changes to the site.	No significant changes to surrounding area.	
2024 Google Earth Imagery	Further riparian zones are present along Te Ararata Creek.	Development has occurred to the northeast, with the development of high density residential properties.	

Appendix D Site contamination enquiry

Walmsley Road Reserve

Consent

CONSENT_NUMBER	FILE_REFERENCE	ACTIVITY	CONSENT_HOLDER	CONSENT_STATUS	GRANTED_DATE	REVIEW_DATE	EXPIRY_DATE	PROCESSING_OFFICER	PURPOSE	WORKS_DESCRIPTION	EASTING	NORTHING	ACTIVITY_ID	ACTIVITY_STATUS
46692	18908	Stormwater Discharge	NZ Transport Agency Attention: Tammy Muharemi	Issued	20160728	20170630	20421130	Abby Sharma	Variation to conditions of permits 32637 and 32693 (R/VCC/2016/1665 and R/VCC/2016/1667) to divert and discharge stormwater from impervious areas associated with provision of additional auxiliary lanes for SH20 at Onehunga Foreshore.		1759787	5908808	21522	Proposed
46693	19092	Stormwater Discharge	NZ Transport Agency Attention: Tammy Muharemi	Issued	20160728	20170630	20421130	Abby Sharma	Variation to conditions of permits 32637 and 32693 (R/VCC/2016/1665 and R/VCC/2016/1667) to divert and discharge stormwater from impervious areas associated with provision of additional auxiliary lanes for SH20 at Onehunga Foreshore.		1759787	5908808	21530	Proposed
15158	BR9611050	Stormwater Discharge	BP Oil New Zealand Limited Attn: Asset Administrator	Superseded	19961104		20311231	_Tim Rix-Trott	TO DIVERT AND DISCHARGE STORMWATER FROM THE REDEVELOPMENT OF AN EXISTING SERVICE STATION WITH STORMWATER FROM THE FORECOURT BEING DISCHARGED VIA A STORMWATER TREATMENT DEVICE INTO AN EXISTING COUNCIL STORMWATER PIPED SYSTEM.	CONSTRUCTION OF API TANK, STORMWATER PIPELINES AND MANHOLES.	1759400	5908700	3969	Occurring
25195	11050	Stormwater Discharge	BP Oil New Zealand Limited Attn: Asset Administrator	Issued	20010510		20311231	_Tim Rix-Trott	To divert and discharge stormwater from the redevelopment of an existing service station with stormwater from the forecourt being discharged via a stormwater treatment device into an existing council stormwater piped system.	Construction of API tank, stormwater pipelines and manholes.152 Coronation Road Mangere	1759400	5908700	3969	Occurring
31456	15588	Wastewater Discharge	Watercare Services Limited	Surrendered	20051110	20051231	20390809	_Wayne Hayson	To authorise the discharge of wastewater to land or water (outside the Coastal Marine Area), together with any consequential discharges to air, in accordance with Section 15 of the Resource Management Act 1991 as a result of:Â·Overflows during times of We		1759478	5908526	20687	
32637	18908	Stormwater Discharge	NZ Transport Agency Attention: Tammy Muharemi	Superseded	20080331	20120630	20421130	_Christine Mitchell	To authorise the diversion and discharge of stormwater from treatment devices to service State Highway 20, between Queenstown Road and Walmsley Road interchanges, in accordance with Sections 14(l)(a), 15(l)(a) and 15(l)(b) of the RMA and to authorise the		1759787	5908808	21522	Proposed
32246	18908	Earthwork	NZ Transport Agency Attention: Tammy Muharemi	Surrendered	20080331	20081130	20171130	_Christine Mitchell	To authorise approximately 26.5ha of earthworks associated with the construction of the SH20 Manukau Harbour Crossing Project, in accordance with Section 9(3) of the RMA.		1759787	5908808	21656	Completed
32693	19092	Stormwater Discharge	NZ Transport Agency Attention: Tammy Muharemi	Superseded	20080331	20120630	20421130	_Christine Mitchell	To authorise the diversion and discharge of stormwater from treatment devices to service State Highway 20, between Queenstown Road and Walmsley Road interchanges, in accordance with Sections 14(l)(a), 15(l)(a) and 15(l)(b) of the RMA and to authorise the		1759787	5908808	21530	Proposed
33533	19458	Stormwater Discharge	Auckland Council	Issued	20070326	20070630	20411231	_Michelle Ip	To authorise the diversion and discharge of stormwater from a 17 lot residential subdivision accordance with Sections 14 (1)(a) and 15 (1)(a) and (b) of the Resource Management Act 1991.		1759500	5908900	21638	Proposed

Closed Landfill information

SITEID	SITENAME	SITESTATUS	SITETYPE	SITENOTES	OPERATIONALSTARTDATE	OPERATIONALENDDATE	REFUSETYPE	CONTACTEMAIL	
16	Black Bridge Reserve	Historic	Closed	AUCKLAND COUNCIL	Invalid Date	Invalid Date		closedlandfills@aucklandcouncil.govt.nz	

Hail Activities

SAPSiteID	PropertyAddress	HAILCode	HAILDescription	ValidFrom
11351189	9 Tanners Road Mangere Bridge Auckland 2022			1/01/1900
11410607	5R Walmsley Road Mangere Auckland 2022			1/01/1900
11361172	152 Coronation Road Mangere Bridge Auckland 2022	Service stations including retail or commercial refuelling facilities	Service stations including retail or commercial refuelling facilities	21/11/2022
11399277	35 Walmsley Road Mangere Auckland 2022	Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds	Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds	21/07/2021
11361172	152 Coronation Road Mangere Bridge Auckland 2022	Service stations including retail or commercial refuelling facilities	Service stations including retail or commercial refuelling facilities	21/11/2022
11528933	35 Walmsley Road MANGERE 2022	Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds	Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds	21/07/2021

Permitted Activities

PERMITTED_ACTIVITY_ID	FILE_REFERENCE	PERMITTED_ACTIVITY_HOLDER	PERMITTED_ACTIVITY_TYPE	ACTIVITY	CONSENT_STATUS	GRANTED_DATE	REVIEW_DATE	EXPIRY_DATE	PROCESSING_OFFICER	PURPOSE	WORKS_DESCRIPTION	EASTING	NORTHING	ACTIVITY_ID
51734			Contaminated Site Discharge	Contaminated Site Discharge	Assessment Completed				Andrew Kalbarczyk	File ref: 7-44-3883. Site to undergo res sub development..	Site remediated appropriately. Risk of contam to ground & G/water is low. LTMP recvd & approved.	1759445	5908904	20806

Incidents

INCIDENTNUMBER	XCOORD	YCOORD	NZTMXCOORD	NZTMYCOORD	LOCATION	SUBURB	CATCHMENTCODE	POLLUTANTTYPE	RECIEVED	REPORT	INCIDENTTYPE	ACTIONEDBY	IMPACT	VOLUME
13/3821	1759531.54	5908634.71	1759531.54	5908634.71	Walmsley road	Mangere	744	Wastewater - Sewer Overflow	Hotline	DWSO	Sewage Overflow	Aaron Graham	Potential	<10 litres
09/0508	1759501.5	5908643.1	1759501.5	5908643.1	10 Walmsley road	Mangere	744	Dirt / Inert Minerals / Sediment	Hotline	Brown Stream	Sediment / Stormwater	Matthew Harrex	Natural Water	>1000 litres
09/1006	1759530.1	5908627.5	1759530.1	5908627.5	10 Walmsley Road	Mangere	744	Odour	Hotline	Sewage odour	Air Pollution	Hazel Meadows	Potential	N/A
Nov-16	1759508.09	5908660.1	1759508.09	5908660.1	10 Walmsley road	Mangere	744	Not Found / Nothing	Hotline	Sewage Smell	Not Found	Nora Leuschner	Nil	Nil
10/1317	1759525.59	5908686.23	1759525.59	5908686.23	Walmsley road	Mangere	744	Dirt / Inert Minerals / Sediment	Hotline	Creek running high and milky white	Sediment / Stormwater	Moka Leilani Seaton	Natural Water	>1000 litres
Dec-55	1759551.19	5908850.99	1759551.19	5908850.99	Coronation Rd	Mangere Bridge	744	Not Found / Nothing	Hotline	Foul odour	Not Found	Tim Butler	Nil	Nil
Oct-22	1759525.62	5908620.94	1759525.62	5908620.94	10 Walmsley Road	Mangere	744	Odour	Hotline	sewage odour	Air Pollution	Hazel Meadows	Potential	N/A
Dec-58	1759471.32	5908664.12	1759471.32	5908664.12	1R Walmsley Rd	Otahuhu	745	Wastewater - Sewer Overflow	Hotline	DWSO	Water / Land Pollution	Fiona Southall	Natural Water	<10 litres

Surrounding Bores Information

CONSENT_NUMBER	BORE_ID	EASTING	NORTHING	ACTIVITY_STATUS	ACTIVITY_DESCRIPTION	SITE_NAME	SITE_DESCRIPTION	MAIN_AQUIFER	AQUIFER	TLA	DATE_DRILLED	TOTAL_DEPTH	GROUND_ELEVATION	STATIC_WATER_LEVEL
0	29997	1759535	5908800	Drilled	Drilled pre 1987 for Manukau County Council by driller unknown. Source location from 'Mangere Mountain Education Centre (MMEC) Precinct Pump House and Well' report by Ian Lawlor 9/7/2009 MCC	Auckland Council	Mangere Auxilliary water supply bore5R Walmsley RdLot 218 5059109 subs.t mangere	Kaawa	Manukau Kaawa	Manukau	19280101	47.3	7.5	4.5

Reformatted for Printing

Surrounding Bores Information

CONSENT_NUMBER	BORE_ID	EASTING	NORTHING	ACTIVITY_STATUS	ACTIVITY_DESCRIPTION	SITE_NAME	SITE_DESCRIPTION	MAIN_AQUIFER	AQUIFER	TLA
0	29997	1759535	5908800	Drilled	Drilled pre 1987 for Manukau County Council by driller unknown. Source location from 'Mangere Mountain Education Centre (MMEC) Precinct Pump House and Well' report by Ian Lawlor 9/7/2009 MCC	Auckland Council	Mangere Auxilliary water supply bore5R Walmsley RdLot 218 5059109 subs.t mangere	Kaawa	Manukau Kaawa	Manukau

DATE_DRILLED	TOTAL_DEPTH	GROUND_ELEVATION	STATIC_WATER_LEVEL	STATIC_WATER_DATE	BORE_LOG	DIAMETER_FROM	DIAMETER_TO	DIAMETER	CASING_FROM	CASING_TO	CASING_DIAMETER	DATE_CREATED	LOC_TYP
19280101	47.3	7.5	4.5	19280101	Y	0	47.3	150	0	37.8	150	20170601	Point

Consent

ACTIVITY_DESCRIPTION	SITE_NAME	SITE_DESCRIPTION	DATE_CREATED	PROPERTY_ADDRESS	LOC_TYP	MONITORING_OFFICER	PREVIOUS_INSPECTION_DATE	NEXT_INSPECTION_DATE
Variation to conditions of permits 32637 and 32693 (R/VCC/2016/1665 and R/VCC/2016/1667) to divert and discharge stormwater from impervious areas associated with provision of additional auxiliary lanes for SH20 at Onehunga Foreshore.	Manukau Harbour Crossing	State Highway 20 between Queenstown Road and Walmsley Road Interchanges.	2/06/2017	SH 20 between Queenstown Road and Walmsley Road Interchanges, Manukau City and Auckland City	Point	Jos Fryer	Invalid Date	Invalid Date
Variation to conditions of permits 32637 and 32693 (R/VCC/2016/1665 and R/VCC/2016/1667) to divert and discharge stormwater from impervious areas associated with provision of additional auxiliary lanes for SH20 at Onehunga Foreshore f stormwater.	SH20 Manukau Harbour Crossing		2/06/2017	SH 20 between Queenstown Road and Walmsley Road Interchanges Manukau City and Auckland City	Point	Jos Fryer	Invalid Date	Invalid Date
	BP Mangere		2/06/2017	152 Coronation Road Mangere Bridge Manukau	Point	_Tim Rix-Trott	27/06/2002	Invalid Date
	BP Mangere		2/06/2017	152 Coronation Road Mangere Bridge Manukau	Point	_Christine Oakey	6/12/2013	1/11/2014
Application to discharge wastewater from the Watercare Services Ltd wastewater network within both Auckland and Manukau Cities for the Mangere Inlet Catchment	Black Bridge Pump Station	Watercare Services Limited	2/06/2017	R 6 Walmsley Road Mangere Manukau	Point	Patricia Burford	Invalid Date	Invalid Date
Variation to conditions of permits 32637 and 32693 (R/VCC/2016/1665 and R/VCC/2016/1667) to divert and discharge stormwater from impervious areas associated with provision of additional auxiliary lanes for SH20 at Onehunga Foreshore.	Manukau Harbour Crossing	State Highway 20 between Queenstown Road and Walmsley Road Interchanges.	2/06/2017	SH 20 between Queenstown Road and Walmsley Road Interchanges, Manukau City and Auckland City	Point	Adam Duncan	12/12/2012	1/07/2013
Approxmately 26.5 ha of earthworks for the constructionof the new motorway.	Manukau Harbour Crossing		2/06/2017	SH 20 between Queenstown Road and Walmsley Road Interchanges, Manukau City and Auckland City	Point	_John Kennedy	29/09/2010	Invalid Date
Variation to conditions of permits 32637 and 32693 (R/VCC/2016/1665 and R/VCC/2016/1667) to divert and discharge stormwater from impervious areas associated with provision of additional auxiliary lanes for SH20 at Onehunga Foreshore f stormwater.	SH20 Manukau Harbour Crossing		2/06/2017	SH 20 between Queenstown Road and Walmsley Road Interchanges Manukau City and Auckland City	Point	_Christine Oakey	Invalid Date	Invalid Date
To discharge stormwater from 4080 square metres of impervious area associated with the development of a 17 lot residential subdivision.	Goodwin Building Services Ltd		2/06/2017	140 Coronation Road Mangere Bridge Manukau	Point	_Christine Oakey	2/05/2013	1/10/2014

Permitted Activities

ACTIVITY_STATUS	ACTIVITY_DESCRIPTION	SITE_NAME	SITE_DESCRIPTION	DATE_CREATED	PROPERTY_ADDRESS	LOC_TYP
Completed	File ref: 7-44-3883. Site to undergo res sub development.		File ref: 7-44-3883. Site to undergo res sub development.	2/06/2017	134 Coronation Road Mangere Bridge Manukau	Area

Incidents

PROBLEMFOUND	CULPRITTRACED	RECORDDATE	INVESTIGATIONDATE
YES	YES	1/12/2013	1/12/2013
YES	YES	2/02/2009	2/02/2009
YES	YES	12/03/2009	12/03/2009
NO	YES	8/12/2011	8/12/2011
YES	YES	28/03/2010	28/03/2010
NO	YES	20/11/2012	20/11/2012
YES	YES	10/11/2010	10/11/2010
YES	YES	5/10/2012	5/10/2012

Surrounding Bores Information

STATIC_WATER_DATE	BORE_LOG	DIAMETER_FROM	DIAMETER_TO	DIAMETER	CASING_FROM	CASING_TO	CASING_DIAMETER	DATE_CREATED	LOC_TYP
19280101	Y	0	47.3	150	0	37.8	150	20170601	Point

21/08/2024

Tonkin & Taylor Limited
PO Box Number: 2093
Wellington

Attention: Carmen Thornton

Dear Carmen,

Site Contamination Enquiry – *Walmsley Road Reserve*

This letter is in response to your enquiry requesting available site contamination information within Auckland Council records for the above site. Please note this report does not constitute a site investigation report; such reports are required to be prepared by a (third-party) Suitably Qualified and Experienced Practitioner.

The following details are based on information available to the Contamination, Air & Noise Team in the Resource Consent Department. The details provided may be from former regional council information, as well as property information held by the former district/city councils. For completeness the relevant property file should also be requested to obtain all historical records and reports via 09 3010101 or online at:

https://www.aucklandcouncil.govt.nz/buying-property/order-property-report/Pages/order-property-file.aspx.

1. Hazardous Activities and Industries List (HAIL) Information

This list published by the Ministry for the Environment (MfE) comprises activities and industries that are considered likely to cause land contamination as a result of hazardous substance use, storage, and/or disposal.

There is no contamination information held within Council's records for the site (Walmsley Road Reserve).

The sites close proximity to Black Bridge Reserve Closed Landfill should be considered, activities or works occurring within the site may need to consider closed landfill hazards.

Please note:

- *If you are demolishing any building that may have asbestos containing materials (ACM) in it, you have obligations under the Health and Safety at Work (Asbestos) Regulations 2016 for the management and removal of asbestos, including the need to engage a Competent Asbestos Surveyor to confirm the presence or absence of any ACM.*
- *Paints used on external parts of properties up until the mid-1970's routinely contained lead, a poison and a persistent environmental pollutant. You are advised to ensure that soils affected by old, peeling or flaking paint are assessed in relation to the proposed use of the property, including high risk use by young children.*

2. Consents and Incidents Information (200m radius of the selected site)

The Council database was searched for records of the following activities within approximately 200 metres of the site and results are displayed in Figure 1 below:

- Pollution Incidents (including air discharges, oil or diesel spills)
- Bores
- Contaminated site and air discharges, and industrial trade process consents
- Closed Landfills
- Air quality permitted activities
- Identified HAIL activities

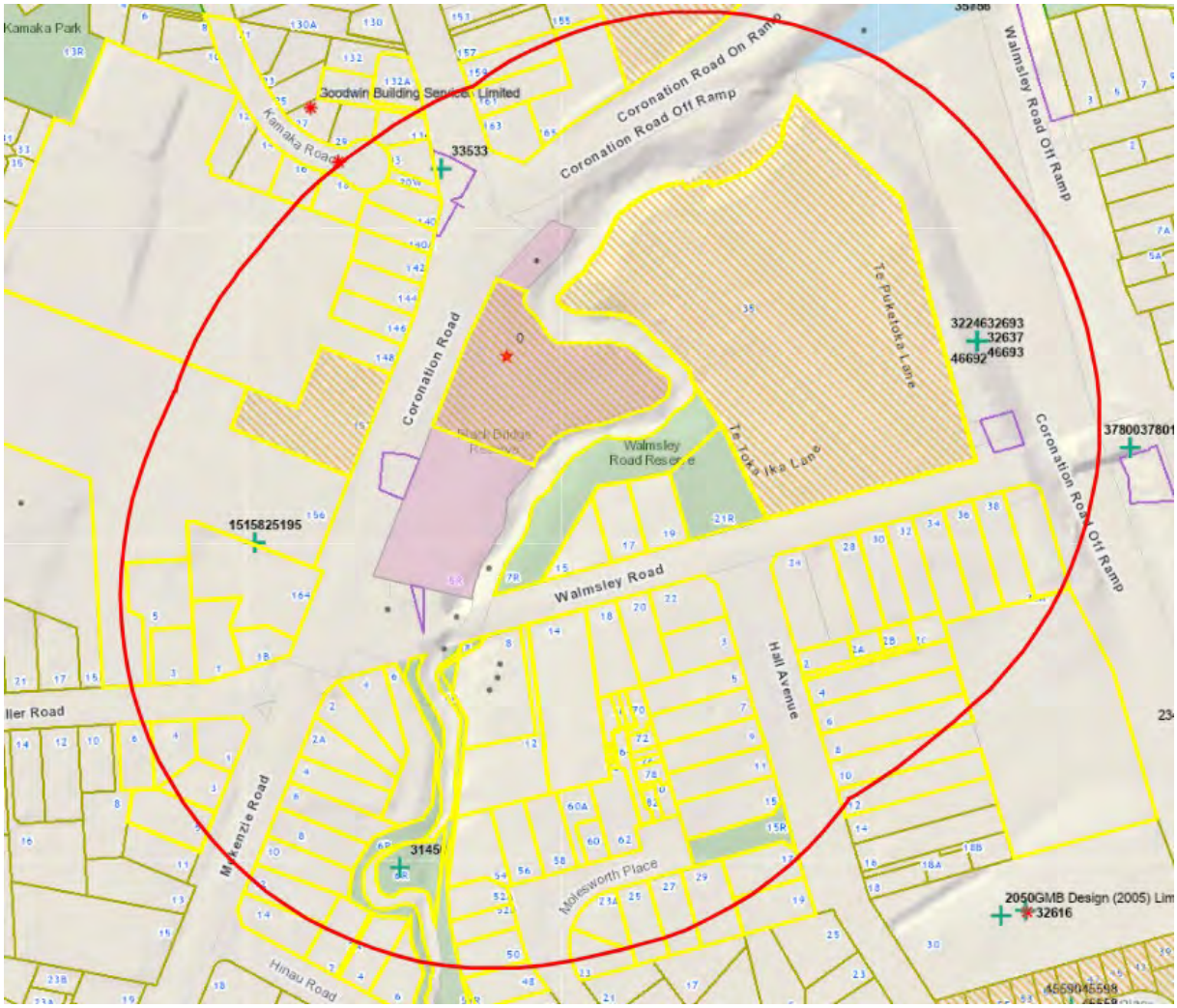


Figure 1: Selected Consents, Incidents and HAIL activities within approximately 200m of the subject site

Legend:

All Consents
All Applications
All Permitted Activities
All Bores
Closed Landfill (Auckland Council owned)
Closed Landfill (Privately owned)
All Incidents
HAIL activities

Relevant details of any pollution incidents and consents and HAIL activities are appended to this letter (Attachment A). Please refer to the column titled ‘Property Address’ on the spreadsheet to aid in identifying corresponding data on the map.

For any identified HAIL sites, please refer to the tab “HAIL activities” for more information (Column C and D include HAIL activity details where these are available).

AND

The following site within the search area have been identified as closed landfills and may have been subject to historical filling / importation of unverified-origin material. Please note that this information is indicative only and our database of such sites is incomplete.

A. INDICATIVE ONLY	**Please contact closedlandfills@aucklandcouncil.govt.nz**
OWNERSHIP:	Auckland Council
SITE ID:	16
PROPERTY DESCRIPTION ADDRESS:	
SITE NAME:	Black Bridge Reserve

Please note:

The HAIL activity hatching in Figure 1 only reflects whether a site has been identified as a HAIL site (both verified and non-verified) by the Council and the type of HAIL associated with the site. This does not confirm whether the site has been formally investigated or the contamination status of the property (e.g. contaminated, remediated etc.). Additionally, due to limitations within Council's records, the specific HAIL activity is not included in the data for all properties. For further information on any of these known HAIL sites, a subsequent site contamination enquiry can be lodged for the specific property (up to 5 adjacent properties can be covered in one request).

While the Auckland Council has carried out the above search using its best practical endeavours, it does not warrant its completeness or accuracy and disclaims any responsibility or liability in respect of the information. If you or any other person wishes to act or to rely on this information, or make any financial commitment based upon it, it is recommended that you seek appropriate technical and/or professional advice.

If you wish to clarify anything in this letter that relates to this site, please contact contaminatedsites@aucklandcouncil.govt.nz. Any follow up requests for information on other sites must go through the online order process.

Should you wish to request any of the files referenced above and/or listed in the attached spreadsheet for viewing, please contact the Auckland Council Call Centre on 301 0101 and note you are requesting former Auckland Regional Council records (the records department requires three working days' notice to ensure the files will be available).

Please note Auckland Council cost recovers officer's time for all site enquiries. As such an invoice for the time involved in this enquiry will follow shortly.

Yours Sincerely,

Contamination, Air and Noise Team
Specialist Unit | Resource Consents
Auckland Council

Appendix E Borehole logs

HAND AUGER LOG

HOLE Id: **HA01**

Hole Location: 5R Walmsley Road, Mangere

SHEET: 1 OF 1

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908688 mN, 1759556 mE (NZTM2000)	DRILL TYPE: 50mm hand auger	HOLE STARTED: 23/08/2024
	METHOD: Hand auger	HOLE FINISHED: 23/08/2024
R.L.: 6m		DRILLED BY: T+T
DATUM: NZVD2016		LOGGED BY: SCZH CHECKED: PRMM

GEOLOGICAL	METHOD OBSERVATIONS									ENGINEERING DESCRIPTION					
STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS	WATER	CORE RECOVERY (%)	METHOD	SCALA PENETROMETER (Blows/100mm) 0 1 2 3 4 5 6 7 8 9	TESTS	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	WEATHERING CLASSIFICATION	MOISTURE CLASSIFICATION	CONSISTENCY / DENSITY CLASSIFICATION	ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H	DESCRIPTION
Topsoil									TS		D	VSt		*0.00m:* SILT, some rootlets, minor clay; dark brown. Very stiff, dry, low plasticity. [TS].
Auckland Volcanic Field					115/29 kPa Insitu 109/48 kPa Insitu 179/32 kPa Insitu >224 kPa Insitu UTP Insitu 86/19 kPa Insitu 64/19 kPa Insitu		5 4 3 2 1	1 2			M	St-VSt		*0.35m:* Silty CLAY; greyish brown. Very stiff, moist, high plasticity. [AVF]. *0.80m:* SILT, minor clay; whitish brown. Stiff to very stiff, moist, low plasticity. *1.00m:* Colour becomes brownish grey
Takanini Formation	▼ 23/08/2024	100	HA		134/19 kPa Insitu 221/67 kPa Insitu 99/35 kPa Insitu 224/32 kPa Insitu >224 kPa Insitu UTP Insitu UTP Insitu UTP Insitu UTP Insitu UTP Insitu		2 1 0	3 4 5			W	VSt		*2.00m:* SILT, some clay; brown. Stiff to very stiff, moist, medium plasticity. [TAKANINI]. *2.20m:* Colour becomes brownish grey *2.50m:* Becomes wet *3.10m:* Silty CLAY; grey mottled orange. Very stiff, wet, high plasticity. *3.40m:* Inclusion of some SAND
											S	St H		*3.90m:* Organic silty CLAY; blackish brown. Stiff, wet, high plasticity. *4.00m:* SILT; light grey. Hard, saturated, dilatant rapid. *4.00m:* low recovery 5.2m: END OF BOREHOLE. Target depth.

0.0-5.2m

COMMENTS:

Hole Depth 5.2m

Scale 1:30

Rev.: A

HAND AUGER PHOTOS

BOREHOLE No.: **HA01**

Hole Location: 5R Walmsley Road, Mangere

SHEET: 1 OF 1

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908688 mN (NZTM2000) 1759556 mE R.L.: 6m DATUM: NZVD2016	DRILL TYPE: 50mm hand auger METHOD: Hand auger	HOLE STARTED: 23/08/2024 HOLE FINISHED: 23/08/2024 DRILLED BY: T+T LOGGED BY: SCZH CHECKED: PRMM

0.00-5.20m

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: BH01

SHEET: 1 OF 6

PROJECT: Te Ararata Stage 2: Design
JOB No.: 1017033.2003
LOCATION: 5R Walmsley Road, Mangere

CO-ORDINATES: 5908666 mN 1759492 mE (NZTM2000)
DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 7m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DRILLED BY: Craig Kennedy
LOGGED BY: SCZH
CHECKED: PRMM
START DATE: 21/08/2024
FINISH DATE: 23/08/2024
CONTRACTOR: McMillan

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m) / Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log / Fracture Spacing (mm) / RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Fill	*0.00m:* Clayey gravelly SILT; dark greyish brown. Stiff, moist, medium to high plasticity. [FILL]. *0.40m:* Steel Waste *0.60m:* Steel Waste			HVAC	0	● 51/6 kPa Insitu ● 176/51 kPa Insitu	0 / 1							
Auckland Volcanic Field	*1.20m:* Slightly to moderately weathered, dark grey, BASALT. Strong to very strong. [AVF].			PQTT	100		1 / 2		70		22/08/2024			
				PQTT	100		2 / 3		91	*1.86m:* J, PL, R, FeSt *1.86-2.00m:* J, 70°, PL, R, FeSt *2.12-2.20m:* J, 60°, PL, R, FeSt *2.18-2.20m:* J, 45°, PL, R, FeSt		35.0m		
	3.40m: Becomes highly vesicular *3.45 - 3. 80m* Crush Zone			PQTT	100		3 / 4		33	*3.45-3.48m:* J, 45°, UN, R, FeSt *3.48-3.50m:* J, 45°, UN, R, FeSt *3.50-3.75m:* J, 70°, PL, R, FeSt *3.55-3.60m:* J, 45°, UN, R, FeSt *3.65-3.68m:* J, 45°, PL, R, FeSt *3.68-3.72m:* J, 20°, PL, R, FeSt *4.05-4.10m:* J, 45°, UN, SM, FeSt *4.20-4.30m:* J, 80°, UN, SM, FeSt *4.30-4.32m:* J, 5°, PL, R, FeSt *4.32-4.34m:* J, 5°, PL, R, FeSt	23/08/2024			Box 0.00-3.45m
	4.50m: Core Loss			PQTT	83		4 / 5							Box 3.45-6.00m
Takanini Formation	*4.75m:* Medium to coarse SAND, some gravel; dark grey. Loosely packed, moist. Gravel, fine. [TAKANINI]. *4.90m:* Silty CLAY; dark grey. Firm, wet, high plasticity. *5.20m:* Becomes stiff to very stiff; Colour becomes light grey mottled orange						5 / 6							

COMMENTS:

Hole Depth 34. 75m

Scale 1:30

Rev.: A

BOREHOLE LOG

BOREHOLE No.: BH01

SHEET: 2 OF 6

Tonkin+Taylor

PROJECT: Te Ararata Stage 2: Design
JOB No.: 1017033.2003
LOCATION: 5R Walmsley Road, Mangere

CO-ORDINATES: 5908666 mN 1759492 mE (NZTM2000)
DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 7m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DRILLED BY: Craig Kennedy
LOGGED BY: SCZH
CHECKED: PRMM
START DATE: 21/08/2024
FINISH DATE: 23/08/2024
CONTRACTOR: McMillan

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Takanini Formation	*6.00m:* Pushtube			PT	70	PT_6.0m @ 6.00m 125/51 kPa Insitu 109/38 kPa In barrel	0	7									
	6.50m: Sandy SILT, minor clay; light whitish grey. Soft to firm, wet, low plasticity. Sand, fine to medium. *6.80m:* becomes dark brownish grey			PQTT	80												
	6.90m: Organic clayey SILT; black. Firm, wet, medium plasticity.						-1	8									
	7.30m: Core Loss																
	7.50m: Pushtube			PT	60	PT_7.5m @ 7.50m 83/0 kPa In barrel											
	8.00m: Core Loss						-2	9									
	8.20m: Organic clayey SILT; black. Firm, wet, medium plasticity.			PQTT	80												
	8.40m: Silty CLAY, minor organic; dark grey mottled black. Firm, moist, high plasticity.																
	8.60m: Sandy SILT; whitish grey. Very stiff to hard, moist. Sand, fine to medium.																
	9.00m: Pushtube			PT	50	PT_9.0m @ 9.00m	-3	10									
	9.50m: Sandy SILT; whitish grey. Very stiff to hard, moist. Sand, fine to medium. *9.90 - 10.10m:* Becomes saturated and soft *10.40m:* Colour becomes dark grey			PQTT	100	DS_9.6m @ 9.60m											Box 6.00-10.10m
	10.50m: Sandy SILT; dark grey. Soft to firm, wet. Sand, fine to medium.			PQTT	100		-4	11									
							-5										

COMMENTS:

Hole Depth 34.75m

Scale 1:30

Rev.: A

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: BH01

SHEET: 3 OF 6

PROJECT: Te Ararata Stage 2: Design
JOB No.: 1017033.2003
LOCATION: 5R Walmsley Road, Mangere

CO-ORDINATES: 5908666 mN 1759492 mE (NZTM2000)
DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 7m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DRILLED BY: Craig Kennedy
LOGGED BY: SCZH
CHECKED: PRMM
START DATE: 21/08/2024
FINISH DATE: 23/08/2024
CONTRACTOR: McMillan

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Takanini Formation	*12.00m:* Pushtube			PT	82	PT_12.0m @ 12.00m											
	12.50m: Sandy SILT; dark grey. Soft to firm, wet. Sand, fine to medium.			PQTT	100		-6	13									Box 10.10-13.50m
	12.70m: Sandy SILT; dark grey. Very stiff to hard, moist. Sand, fine to medium.																
	13.50 - 13.90m Lenses of clayey SILT			PQTT	100	DS_13.75m @ 13.75m	-7	14									
	15.30m: Silty fine to medium SAND; dark grey. Loosely packed, wet.			PQTT	100	DS_16.0m @ 16.00m	-8	15									Box 13.50-15.90m
							-9	16									
	17.60m: Silty fine to medium SAND; dark grey. Tightly packed, moist.			PQTT	100		-10	17									
							-11										

COMMENTS:

Hole Depth 34.75m

Scale 1:30

Rev.: A

BOREHOLE LOG

BOREHOLE No.: BH01

SHEET: 4 OF 6

Tonkin+Taylor

PROJECT: Te Ararata Stage 2: Design
JOB No.: 1017033.2003
LOCATION: 5R Walmsley Road, Mangere

CO-ORDINATES: 5908666 mN 1759492 mE (NZTM2000)
DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 7m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DRILLED BY: Craig Kennedy
LOGGED BY: SCZH
CHECKED: PRMM
START DATE: 21/08/2024
FINISH DATE: 23/08/2024
CONTRACTOR: McMillan

GEOLOGICAL UNIT	MATERIAL DESCRIPTION SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering (UW SW MW HW CW DW RS)	Rock Strength (VS+ S MS W VW EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000 600 200 60 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25 50 75)	Casing	Installation	Core Box No
Takanini Formation	[CONT] *17.60m:* Silty fine to medium SAND; dark grey. Tightly packed, moist. *18.00m:* Becomes saturated and loosely packed			PQTT	100		-12	19									Box 15.90-18.10m
	18.30m: SILT, some clay and some sand; dark grey. Very stiff, moist, low plasticity. Sand, fine to medium. *19.20 - 19.35m* becomes soft																
				PQTT	100	138/51 kPa In barrel	-13	20									Box 18.10-20.30m
	21.00m: Sandy SILT, minor clay; dark grey. Very stiff, moist, low plasticity. Sand, fine to medium.						-14	21									
	21.45m: Fine to medium SAND, minor silt; dark grey. Tightly packed, moist. *21.60m:* Organic SILT, minor clay; black. Hard, moist, low plasticity.			PQTT	100	176/45 kPa In barrel	-15	22									
	22.20m: Clayey SILT; dark brown. Hard, moist, medium plasticity. *22.70m:* Colour becomes light grey, Inclusion of trace SAND						-16	23									Box 20.30-22.70m
	23.30m: Fine to medium SAND, minor silt; light grey. Dense to very dense, moist. *23.60 - 24.50m* Becomes saturated and loosely packed			PQTT	80	UTP In barrel	-17										
	23.70m: Core Loss																

COMMENTS:

Hole Depth 34.75m

Scale 1:30

Rev.: A

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: BH01

SHEET: 5 OF 6

PROJECT: Te Ararata Stage 2: Design
JOB No.: 1017033.2003
LOCATION: 5R Walmsley Road, Mangere

CO-ORDINATES: 5908666 mN 1759492 mE (NZTM2000)
DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 7m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DRILLED BY: Craig Kennedy
LOGGED BY: SCZH
CHECKED: PRMM
START DATE: 21/08/2024
FINISH DATE: 23/08/2024
CONTRACTOR: McMillan

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Takanini Formation	*24.00m:* Fine to medium SAND, minor silt; light grey. Dense to very dense, moist.			PQTT	100	UTP In barrel	-18	25									Box 22.70-25.20m
				SPT	100	3/5// 7/12/12/15 **N=46**	-19										
	26.05m: SAND becomes medium to coarse			PQTT	10		-20	26									
	26.10m: Core Loss																
	27.00m: Fine to medium SAND, minor silt; light grey. Dense to very dense, moist.			SPT	100	1/1// 6/8/8/12 **N=34**	-21	27									
	27.90m: SILT, minor clay; dark brown. Hard, moist, low plasticity.			PQTT	100			28									
	28.50m: Solid SPT - no recovery			SPTC	0	UTP In barrel 4/4// 4/6/5/8 **N=23** Solid Cone	-22										Box 25.20-29.00m
	28.95m: Fine to medium SAND, minor silt; dark grey. Very dense, moist.							29									
	29.35 - 29.60m Soils disturbed from drilling and becomes loosely packed			PQTT	100		-23										

COMMENTS:

Hole Depth 34.75m

Scale 1:30

Rev.: A

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: BH01

SHEET: 6 OF 6

PROJECT: Te Ararata Stage 2: Design
JOB No.: 1017033.2003
LOCATION: 5R Walmsley Road, Mangere

CO-ORDINATES: 5908666 mN 1759492 mE (NZTM2000)
DIRECTION:
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 7m
R.L. COLLAR:
DATUM: NZVD2016
SURVEY: Handheld GPS

DRILLED BY: Craig Kennedy
LOGGED BY: SCZH
CHECKED: PRMM
START DATE: 21/08/2024
FINISH DATE: 23/08/2024
CONTRACTOR: McMillan

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Takanini Formation	[CONT] *28.95m:* Fine to medium SAND, minor silt; dark grey. Very dense, moist. *30.30 - 30.50m* Soils disturbed from drilling and becomes loosely packed			SPTC	0	6/4// 17/20/13 for 15 mm **N>=50** Solid Cone	-24	31									
	31.50m: Solid SPT - no recovery			PQTT	100												
	31.92m: Fine to medium SAND, minor silt; dark grey. Very dense, moist.			SPTC	0	4/6// 10/13/16/ 11 for 45mm **N>=50** Solid Cone	-25	32									
	32.47m: Core Loss			PQTT	51		-26										
	33.00m: Solid SPT - no recovery			SPTC	0	5/15// 26/24 for 60 mm **N>=50** Solid Cone		33									
	33.29m: Fine to medium SAND, minor silt; dark grey. Very dense, moist.			PQTT	50		-27										Box 29.00-33.80m
	33.90m: Core Loss							34									
	34.50m: Solid SPT - no recovery			SPTC	0	7/20// 37/13 for 20 mm **N>=50** Solid Cone	-28										Box 33.80-34.75m
	34.75m: END OF BOREHOLE. Target depth.							35									
							-29										

COMMENTS:

Hole Depth 34.75m

Scale 1:30

Rev.: A

CORE PHOTOS

BOREHOLE No.: **BH01**

Hole Location: 5R Walmsley Road, Mangere

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908666 mN (NZTM2000) 1759492 mE R.L.: 7m DATUM: NZVD2016	DRILL TYPE: METHOD: Rotary cored	HOLE STARTED: 21/08/2024 HOLE FINISHED: 23/08/2024 DRILLED BY: McMillan LOGGED BY: SCZH CHECKED: PRMM

0.00-3.45m

3.45-6.00m

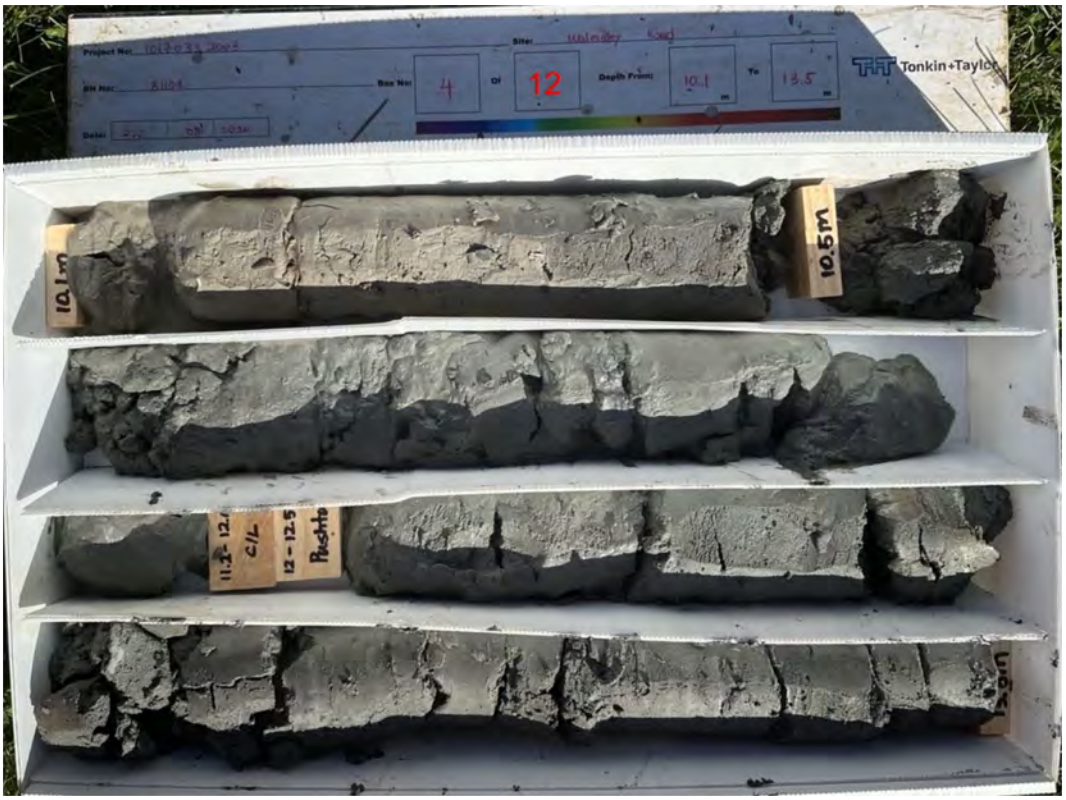
CORE PHOTOS

BOREHOLE No.: **BH01**

Hole Location: 5R Walmsley Road, Mangere

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908666 mN (NZTM2000) 1759492 mE R.L.: 7m DATUM: NZVD2016	DRILL TYPE: METHOD: Rotary cored	HOLE STARTED: 21/08/2024 HOLE FINISHED: 23/08/2024 DRILLED BY: McMillan LOGGED BY: SCZH CHECKED: PRMM

6.00-10.10m



10.10-13.50m

CORE PHOTOS

BOREHOLE No.: **BH01**

Hole Location: 5R Walmsley Road, Mangere

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908666 mN (NZTM2000) 1759492 mE R.L.: 7m DATUM: NZVD2016	DRILL TYPE: METHOD: Rotary cored	HOLE STARTED: 21/08/2024 HOLE FINISHED: 23/08/2024 DRILLED BY: McMillan LOGGED BY: SCZH CHECKED: PRMM

13.50-15.90m

15.90-18.10m

CORE PHOTOS

BOREHOLE No.: **BH01**

Hole Location: 5R Walmsley Road, Mangere

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908666 mN (NZTM2000) 1759492 mE R.L.: 7m DATUM: NZVD2016	DRILL TYPE: METHOD: Rotary cored	HOLE STARTED: 21/08/2024 HOLE FINISHED: 23/08/2024 DRILLED BY: McMillan LOGGED BY: SCZH CHECKED: PRMM

18.10-20.30m

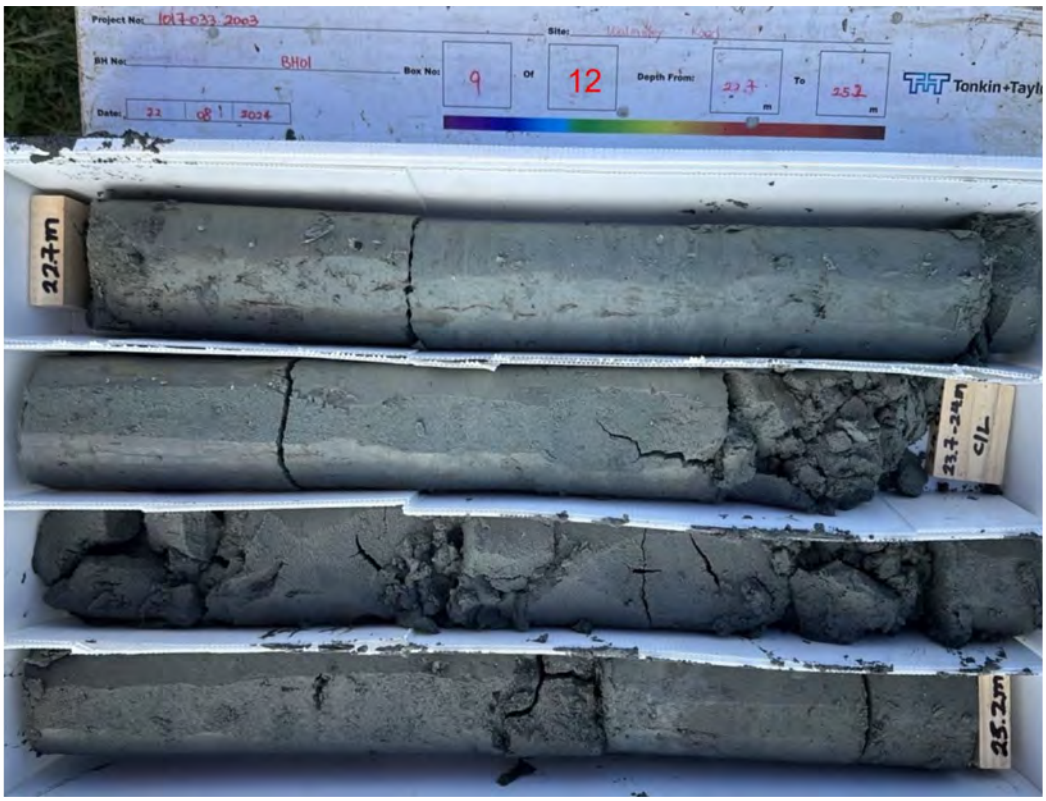
20.30-22.70m

CORE PHOTOS

BOREHOLE No.: **BH01**

Hole Location: 5R Walmsley Road, Mangere

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908666 mN (NZTM2000) 1759492 mE R.L.: 7m DATUM: NZVD2016	DRILL TYPE: METHOD: Rotary cored	HOLE STARTED: 21/08/2024 HOLE FINISHED: 23/08/2024 DRILLED BY: McMillan LOGGED BY: SCZH CHECKED: PRMM



22.70-25.20m

25.20-29.00m

CORE PHOTOS

BOREHOLE No.: **BH01**

Hole Location: 5R Walmsley Road, Mangere

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908666 mN (NZTM2000) 1759492 mE R.L.: 7m DATUM: NZVD2016	DRILL TYPE: METHOD: Rotary cored	HOLE STARTED: 21/08/2024 HOLE FINISHED: 23/08/2024 DRILLED BY: McMillan LOGGED BY: SCZH CHECKED: PRMM

29.00-33.80m

33.80-34.75m

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: BH02

SHEET: 1 OF 1

PROJECT: Te Ararata Stage 2: Design

JOB No.: 1017033.2003

LOCATION: 5R Walmsley Road, Mangere

CO-ORDINATES: 5908694 mN, 1759506 mE (NZTM2000)

DIRECTION:

ANGLE FROM HORIZ.: -90°

R.L. GROUND: 6m

R.L. COLLAR:

DATUM: NZVD2016

SURVEY: Handheld GPS

DRILLED BY: Craig Kennedy

LOGGED BY: SCZH

CHECKED: PRMM

START DATE: 26/08/2024

FINISH DATE: 26/08/2024

CONTRACTOR: McMillan

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Top	*0.00m:* SILT, some rootlets, minor clay; dark brown. Firm, wet, low plasticity. [TS].						6										
Fill	*0.10m:* SILT, some clay and some gravel; dark brown mottled orange. Stiff to very stiff, wet, low plasticity. Gravel, fine. [FILL]. *0.40m:* Some boulders. Becomes saturated. *1.00m:* Some boulders.						5	1									
	1.00m: Core Loss																
	1.50m: SILT, some rootlets, minor clay; light brown mottled grey. Soft, wet, low plasticity.					96/24 kPa Insitu											
	1.70m: Silty BOULDERS; brown mottled grey. Moist. Boulders, sandstone.						4	2						26/08/2024			
Takanini Formation	*2.20m:* Silty fine to medium SAND; dark grey. Loosely packed, saturated.																
	2.30m: Clayey SILT; dark grey. Firm, wet, medium to high plasticity. *2.50m:* Becomes very stiff to hard, Colour becomes light grey mottled orange					138/45 kPa In barrel 192/99 kPa Insitu	3	3									Box 0.00-3.25m
	4.90m: Cobur becomes purplish grey *5.00 - 5.10m* becomes firm					173/29 kPa Insitu 99/19 kPa In barrel	2	4									
	5.30m: SILT, minor clay; light brownish grey. Hard, moist, low plasticity. *5.50m:* Inclusion of organic stain, Colour becomes black						1	5									Box 3.25-6.00m
	5.60m: Silty fine to medium SAND; light brownish grey. Loosely packed, saturated.																
	6m: END OF BOREHOLE. Target depth.																

COMMENTS:

Hole Depth 6m

Scale 1:30

Rev.: A

CORE PHOTOS

BOREHOLE No.: **BH02**

Hole Location: 5R Walmsley Road, Mangere

SHEET: 1 OF 1

PROJECT: Te Ararata Stage 2: Design	LOCATION: Walmsley Road	JOB No.: 1017033.2003
CO-ORDINATES: 5908694 mN (NZTM2000) 1759506 mE R.L.: 6m DATUM: NZVD2016	DRILL TYPE: METHOD: Rotary cored	HOLE STARTED: 26/08/2024 HOLE FINISHED: 26/08/2024 DRILLED BY: McMillan LOGGED BY: SCZH CHECKED: PRMM

0.00-3.25m

3.25-6.00m

Appendix F Laboratory analytical results

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

0508 HILL LAB (44 555 22)
+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

Certificate of Analysis

Client:	Tonkin & Taylor	**Lab No:**	3658384	SPv1
Contact:	Carmen Thornton C/- Tonkin & Taylor PO Box 5271 Auckland 1141	**Date Received:**	27-Aug-2024	
		Date Reported:	03-Sep-2024	
		Quote No:	80842	
		Order No:	1017033.2003	
		Client Reference:	1017033.2003	
		Submitted By:	Georgia Holdsworth	

Sample Type: Soil

		Sample Name:	BH01 0.0-0.2	BH01 0.6-0.7	BH02 0.5-0.6	BH02 1.3-1.5
		Lab Number:	3658384.1	3658384.2	3658384.5	3658384.7
Individual Tests						
Dry Matter	g/100g as rcvd		75	80	76	81
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt		5	4	4	4
Total Recoverable Cadmium	mg/kg dry wt		0.19	0.17	0.19	0.16
Total Recoverable Chromium	mg/kg dry wt		48	49	51	52
Total Recoverable Copper	mg/kg dry wt		33	37	35	37
Total Recoverable Lead	mg/kg dry wt		43	60	48	53
Total Recoverable Nickel	mg/kg dry wt		50	67	62	63
Total Recoverable Zinc	mg/kg dry wt		84	92	92	92
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt		1.4	1.3	3.6	9.4
1-Methylnaphthalene	mg/kg dry wt		< 0.014	< 0.013	< 0.014	< 0.013
2-Methylnaphthalene	mg/kg dry wt		< 0.014	< 0.013	< 0.014	< 0.013
Acenaphthylene	mg/kg dry wt		< 0.014	< 0.013	< 0.014	0.018
Acenaphthene	mg/kg dry wt		< 0.014	< 0.013	0.026	0.040
Anthracene	mg/kg dry wt		0.018	0.013	0.064	0.132
Benzo[a]anthracene	mg/kg dry wt		0.104	0.094	0.25	0.70
Benzo[a]pyrene (BAP)	mg/kg dry wt		0.128	0.112	0.32	0.86
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt		0.189	0.165	0.46	1.26
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt		0.187	0.162	0.45	1.24
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt		0.150	0.139	0.36	0.94
Benzo[e]pyrene	mg/kg dry wt		0.082	0.070	0.191	0.50
Benzo[g,h,i]perylene	mg/kg dry wt		0.096	0.084	0.21	0.58
Benzo[k]fluoranthene	mg/kg dry wt		0.052	0.051	0.124	0.38
Chrysene	mg/kg dry wt		0.102	0.086	0.25	0.68
Dibenzo[a,h]anthracene	mg/kg dry wt		0.018	0.013	0.036	0.114
Fluoranthene	mg/kg dry wt		0.24	0.23	0.59	1.63
Fluorene	mg/kg dry wt		< 0.014	< 0.013	0.017	0.025
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt		0.091	0.080	0.196	0.61
Naphthalene	mg/kg dry wt		< 0.07	< 0.07	< 0.07	< 0.07
Perylene	mg/kg dry wt		0.030	0.028	0.080	0.22
Phenanthrene	mg/kg dry wt		0.072	0.051	0.24	0.42
Pyrene	mg/kg dry wt		0.24	0.22	0.60	1.55

Sample Type: Soil					
Sample Name:		BH01 0.0-0.2	BH01 0.6-0.7	BH02 0.5-0.6	BH02 1.3-1.5
Lab Number:		3658384.1	3658384.2	3658384.5	3658384.7
Total Petroleum Hydrocarbons in Soil					
C7 - C9	mg/kg dry wt	< 20	< 20	< 20	-
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	< 80	< 80	< 80	-

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).	-	1-2, 5, 7
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	1-2, 5, 7
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	1-2, 5, 7
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	1-2, 5, 7
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	1-2, 5, 7
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	1-2, 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	1-2, 5, 7
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	7
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-2, 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	1-2, 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	1-2, 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	1-2, 5

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

Testing was completed between 30-Aug-2024 and 03-Sep-2024. 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

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Certificate of Analysis

Client:	Tonkin & Taylor	**Lab No:**	3658385 A2Pv1
Contact:	Carmen Thornton	**Date Received:**	27-Aug-2024
	C/- Tonkin & Taylor	**Date Reported:**	05-Sep-2024
	PO Box 5271	**Quote No:**	80842
	Auckland 1141	**Order No:**	1017033.2003
		Client Reference:	1017033.2003
		Submitted By:	Georgia Holdsworth

Sample Type: Soil

Sample Name:		BH01 0.0-0.2	BH01 0.6-0.7	BH02 0.5-0.6
Lab Number:		3658385.1	3658385.2	3658385.5
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001
As Received Weight	g	503.6	493.5	541.6
Dry Weight	g	368.8	395.4	423.6
Moisture*	%	27	20	22
Sample Fraction >10mm	g dry wt	55.3	43.3	54.4
Sample Fraction <10mm to >2mm	g dry wt	175.2	197.5	214.7
Sample Fraction <2mm	g dry wt	137.3	153.7	153.2
<2mm Subsample Weight	g dry wt	50.3	50.7	50.4
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
- ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
- Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
- Trace - Trace levels of asbestos, as defined by AS4964-2004.

For further details, please contact the Asbestos Team.

Please refer to the BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil.
https://www.branz.co.nz/asbestos

The following assumptions have been made:

1. Asbestos Fines in the <2mm fraction, after homogenisation, is evenly distributed throughout the fraction
2. The weight of asbestos in the sample is unaffected by the ashing process.

Results are representative of the sample provided to Hill Laboratories only.

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
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g	1-2, 5
Dry Weight	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	1-2, 5
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-2, 5
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-2, 5
Sample Fraction <10mm to >2mm	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-2, 5
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch.	0.1 g dry wt	1-2, 5
Asbestos Presence / Absence	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%	1-2, 5
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-2, 5
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 5
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 5
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 5
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 5
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; Unit 1, 17 Print Place, Middleton, Christchurch. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 5
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 5
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 5

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

Testing was completed on 05-Sep-2024. 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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