PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS

SHAFT SH09

LEGEND

Potential Contamination Sources
- Unknown HAIL tag
- Not HAIL, potential contamination identified

- Concept Design Alignment
- Permanent shaft
- Approximate construction areas

SUMMARY OF CONTAMINATED MATERIAL MANAGEMENT OPTIONS (TABLE 2, CLMP)

1. General controls for earthworks (spoil handling and disposal requirements) are provided within this CLMP.
2. General controls for groundwater and stormwater provided within this CLMP.

TESTING AND DISPOSAL REQUIREMENTS (TABLE 8, CLMP)

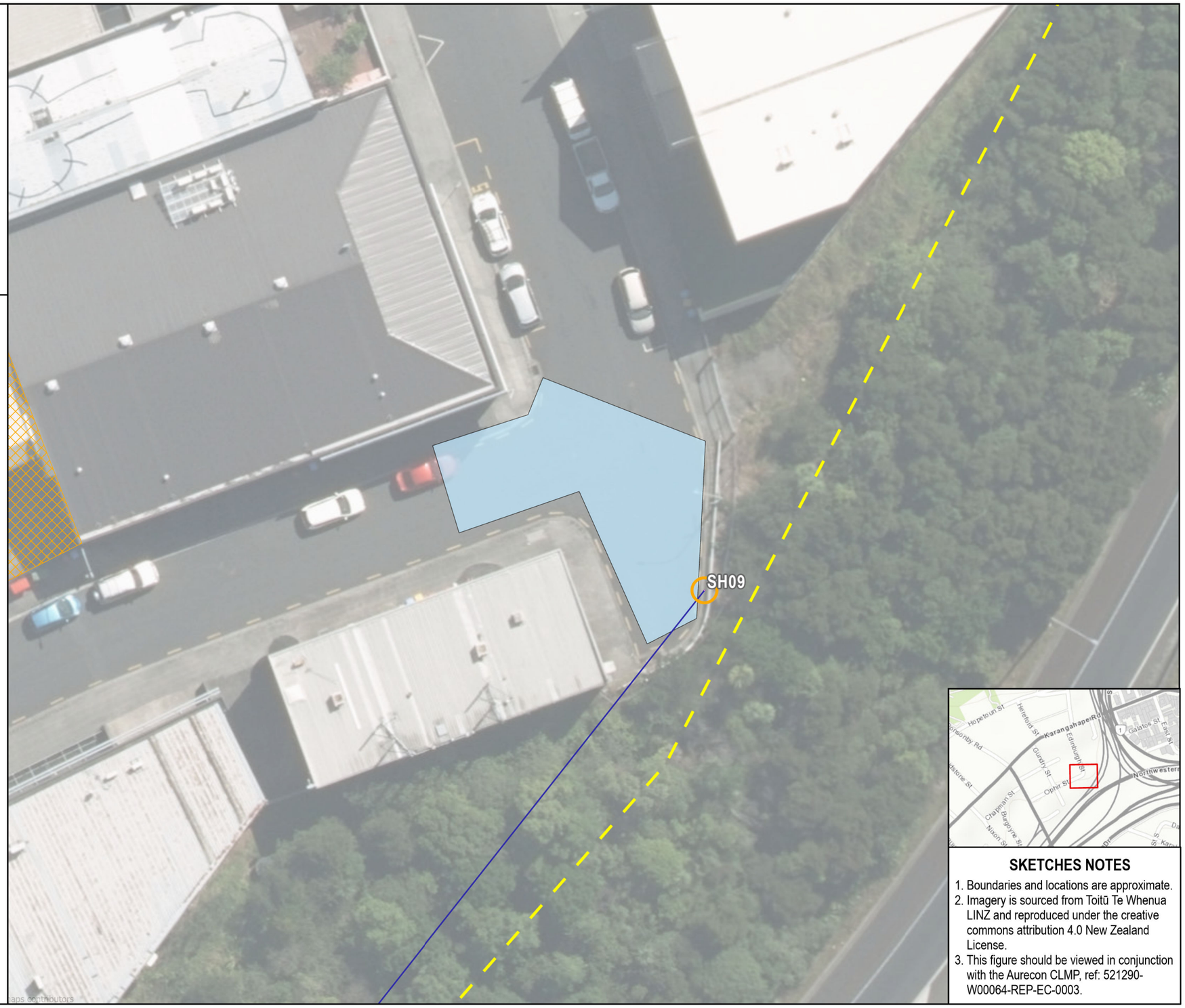
1. **Spoil < 2 m** - Offsite disposal to suitably licenced Class 3 landfill facility.
2. **Spoil > 2 m** - Suitable for offsite disposal to a cleanfill facility.
3. **Groundwater** - Groundwater is not impacted by concentrations of contaminants that require additional management.
4. **Stormwater** - Not required, if stormwater controls in place while managing spoil removal <2m.

UNEXPECTED CONTAMINATION DISCOVERY PROTOCOL

1. Refer to CLMP Table 6.

CLMP SECTION REFERENCES

1. Refer to **Section 4** for **Site management procedures** relating to consents and plans, site record keeping and monitoring requirements, induction and awareness.
2. Refer to **Section 5** for **Environmental management procedure** relating to excavation, transportation and disposal of spoil, erosion and sediment control and ESCP, stockpiling, dust and odour management controls, groundwater management and dewatering, and imported material.
3. Refer to **Section 6** for **Health and safety controls** relating to site control information required and PPE.



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A01	2025-06-06	ISSUED FOR INFORMATION	A01	H. SUSSEX	H. SUSSEX	M. TENDAM	A. HODGSON

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0 0.75 1.5 3 4.5 6 7.5 9 m

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PROJECT	WATERCARE SERVICES LIMITED WIWQIP MOTIONS CATCHMENT IMPROVEMENTS
TITLE	PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS SHAFT SH09
DOCUMENT CODE	521290-W00064-SKT-EC-1009

SCALE	SIZE	REFERENCE No.	REV
1:300	A3	521290-064	A01

PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS

SHAFT SH10

LEGEND

Potential Contamination Sources
- HAIL A17: Storage tank
- HAIL F4: Automotive workshop
- Not HAIL, potential contamination identified

- Concept Design Alignment
- Permanent shaft
- Approximate construction areas

SUMMARY OF CONTAMINATED MATERIAL MANAGEMENT OPTIONS (TABLE 2, CLMP)

1. General controls for earthworks (spoil handling and disposal requirements) are provided within this CLMP.
2. General controls for groundwater and stormwater provided within this CLMP.

TESTING AND DISPOSAL REQUIREMENTS (TABLE 8, CLMP)

1. **Spoil < 2 m** - Offsite disposal to suitably licenced Class 3 landfill facility.
2. **Spoil > 2 m** - Suitable for offsite disposal to a cleanfill facility.
3. **Groundwater** - Groundwater is not impacted by concentrations of contaminants that require additional management.
4. **Stormwater** - Not required, if stormwater controls in place while managing spoil removal <2m.

UNEXPECTED CONTAMINATION DISCOVERY PROTOCOL

1. Refer to CLMP Table 6.

CLMP SECTION REFERENCES

1. Refer to **Section 4** for **Site management procedures** relating to consents and plans, site record keeping and monitoring requirements, induction and awareness.
2. Refer to **Section 5** for **Environmental management procedure** relating to excavation, transportation and disposal of spoil, erosion and sediment control and ESCP, stockpiling, dust and odour management controls, groundwater management and dewatering, and imported material.
3. Refer to **Section 6** for **Health and safety controls** relating to site control information required and PPE.

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0 0.75 1.5 3 4.5 6 7.5 9 m

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PROJECT			
WATERCARE SERVICES LIMITED WIWQIP MOTIONS CATCHMENT IMPROVEMENTS			
TITLE			
PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS SHAFT SH10			
DOCUMENT CODE			
521290-W00064-SKT-EC-1010			
SCALE	SIZE	REFERENCE No.	REV
1:300	A3	521290-064	A01

PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS

SHAFT SH11

LEGEND

Potential Contamination Sources

Not HAIL, potential contamination identified

Concept Design Alignment

Permanent shaft

Approximate construction areas

SUMMARY OF CONTAMINATED MATERIAL MANAGEMENT OPTIONS (TABLE 2, CLMP)

1. General controls for earthworks (spoil handling and disposal requirements) are provided within this CLMP.
2. General controls for groundwater and stormwater provided within this CLMP.

TESTING AND DISPOSAL REQUIREMENTS (TABLE 8, CLMP)

1. **Spoil < 2 m** - Offsite disposal to suitably licenced Class 3 landfill facility.
2. **Spoil > 2 m** - Suitable for offsite disposal to a cleanfill facility.
3. **Groundwater** - Groundwater is not impacted by concentrations of contaminants that require additional management.
4. **Stormwater** - Not required, if stormwater controls in place while managing spoil removal <2m.

UNEXPECTED CONTAMINATION DISCOVERY PROTOCOL

1. Refer to CLMP Table 6.

CLMP SECTION REFERENCES

1. Refer to **Section 4** for **Site management procedures** relating to consents and plans, site record keeping and monitoring requirements, induction and awareness.
2. Refer to **Section 5** for **Environmental management procedure** relating to excavation, transportation and disposal of spoil, erosion and sediment control and ESCP, stockpiling, dust and odour management controls, groundwater management and dewatering, and imported material.
3. Refer to **Section 6** for **Health and safety controls** relating to site control information required and PPE.

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0 0.75 1.5 3 4.5 6 7.5 9 m

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PROJECT	WATERCARE SERVICES LIMITED WIWQIP MOTIONS CATCHMENT IMPROVEMENTS
TITLE	PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS SHAFT SH11
DOCUMENT CODE	521290-W00064-SKT-EC-1011

SCALE	SIZE	REFERENCE No.	REV
1:300	A3	521290-064	A01

PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS

SHAFT SH12

LEGEND

Potential Contamination Sources

- HAIL B3: Electronics manufacture
- HAIL D4: Metal processing
- HAIL G3: Closed landfill
- Unknown HAIL tag
- Remediated HAIL site
- Concept Design Alignment
- Permanent shaft
- Temporary shaft
- Approximate construction areas

SUMMARY OF CONTAMINATED MATERIAL MANAGEMENT OPTIONS (TABLE 2, CLMP)

1. Works in accordance with final resource consent conditions the AOA and final resource consent conditions.
2. Controls for earthworks (spoil handling and disposal requirements), groundwater and stormwater are provided within this CLMP.

TESTING AND DISPOSAL REQUIREMENTS (TABLE 8, CLMP)

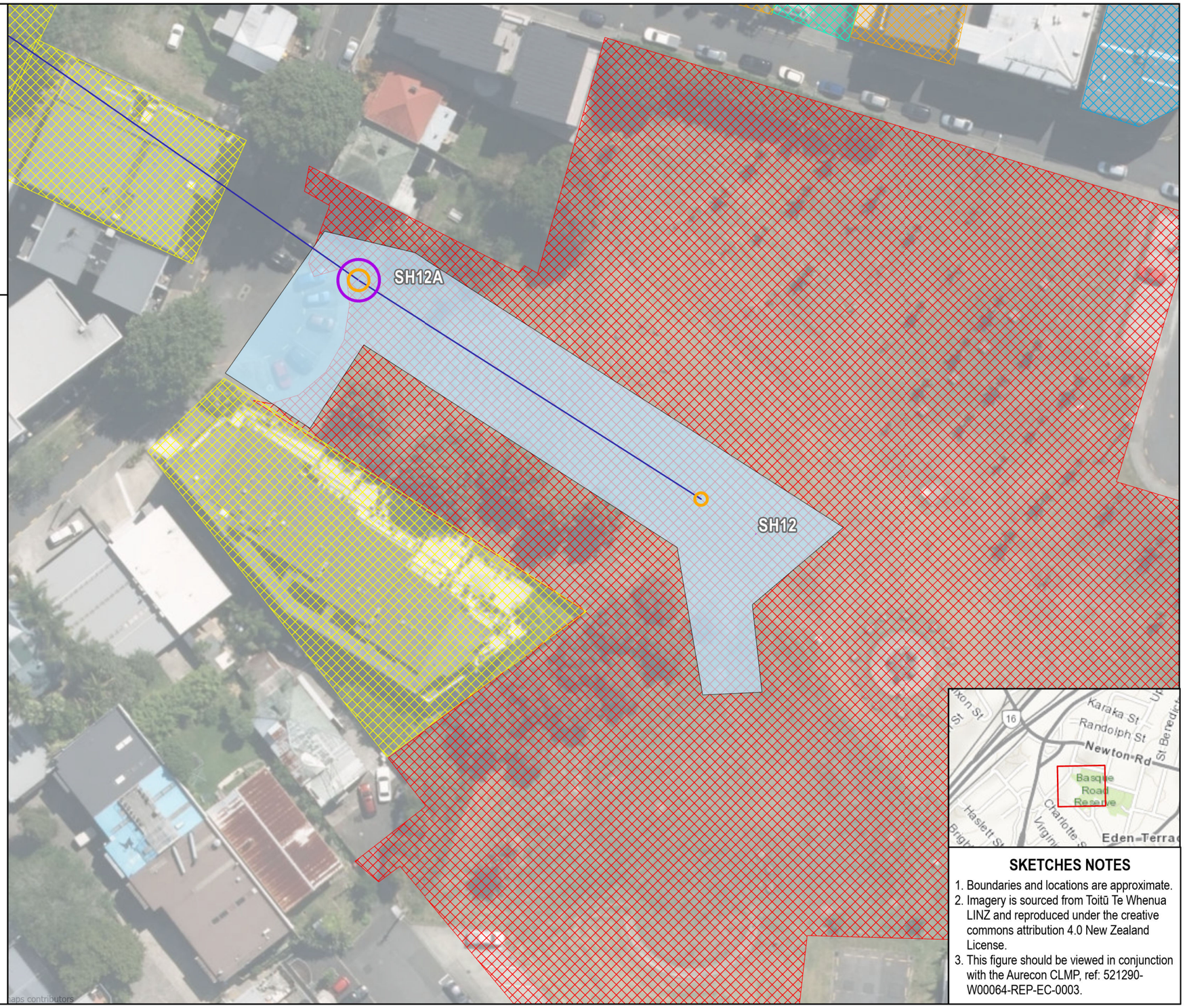
1. **Spoil < 2 m** - Offsite disposal to suitably licenced Class 3 licenced landfill facility. Confirmation with landfill facility will be required.
2. **Spoil > 2 m** - Offsite disposal to suitably licenced Class 3 licenced landfill facility. Confirmation with landfill facility will be required.
3. **Groundwater** - Pending confirmation
4. **Stormwater** - Pending confirmation

UNEXPECTED CONTAMINATION DISCOVERY PROTOCOL

1. Refer to CLMP Table 6.

CLMP SECTION REFERENCES

1. Refer to **Section 4** for **Site management procedures** relating to consents and plans, site record keeping and monitoring requirements, induction and awareness.
2. Refer to **Section 5** for **Environmental management procedure** relating to excavation, transportation and disposal of spoil, erosion and sediment control and ESCP, stockpiling, dust and odour management controls, groundwater management and dewatering, and imported material.
3. Refer to **Section 6** for **Health and safety controls** relating to site control information required and PPE.



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0 1.5 3 6 9 12 15 18 m

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DESIGNED BY	H. SUSSEX
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PROJECT	WATERCARE SERVICES LIMITED WIWQIP MOTIONS CATCHMENT IMPROVEMENTS
TITLE	PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS SHAFT SH12/12A
DOCUMENT CODE	521290-W00064-SKT-EC-1012

SCALE	SIZE	REFERENCE No.	REV
1:600	A3	521290-064	A01

PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS

SHAFT SH13

LEGEND

Potential Contamination Sources
- HAIL H: Contaminant migration
- HAIL I: Release of contaminants
- Not HAIL, potential contamination identified

- Concept Design Alignment
- Permanent shaft
- Approximate construction areas

SUMMARY OF CONTAMINATED MATERIAL MANAGEMENT OPTIONS (TABLE 2, CLMP)

1. General controls for earthworks (spoil handling and disposal requirements) are provided within this CLMP.
2. General controls for groundwater and stormwater provided within this CLMP.

TESTING AND DISPOSAL REQUIREMENTS (TABLE 8, CLMP)

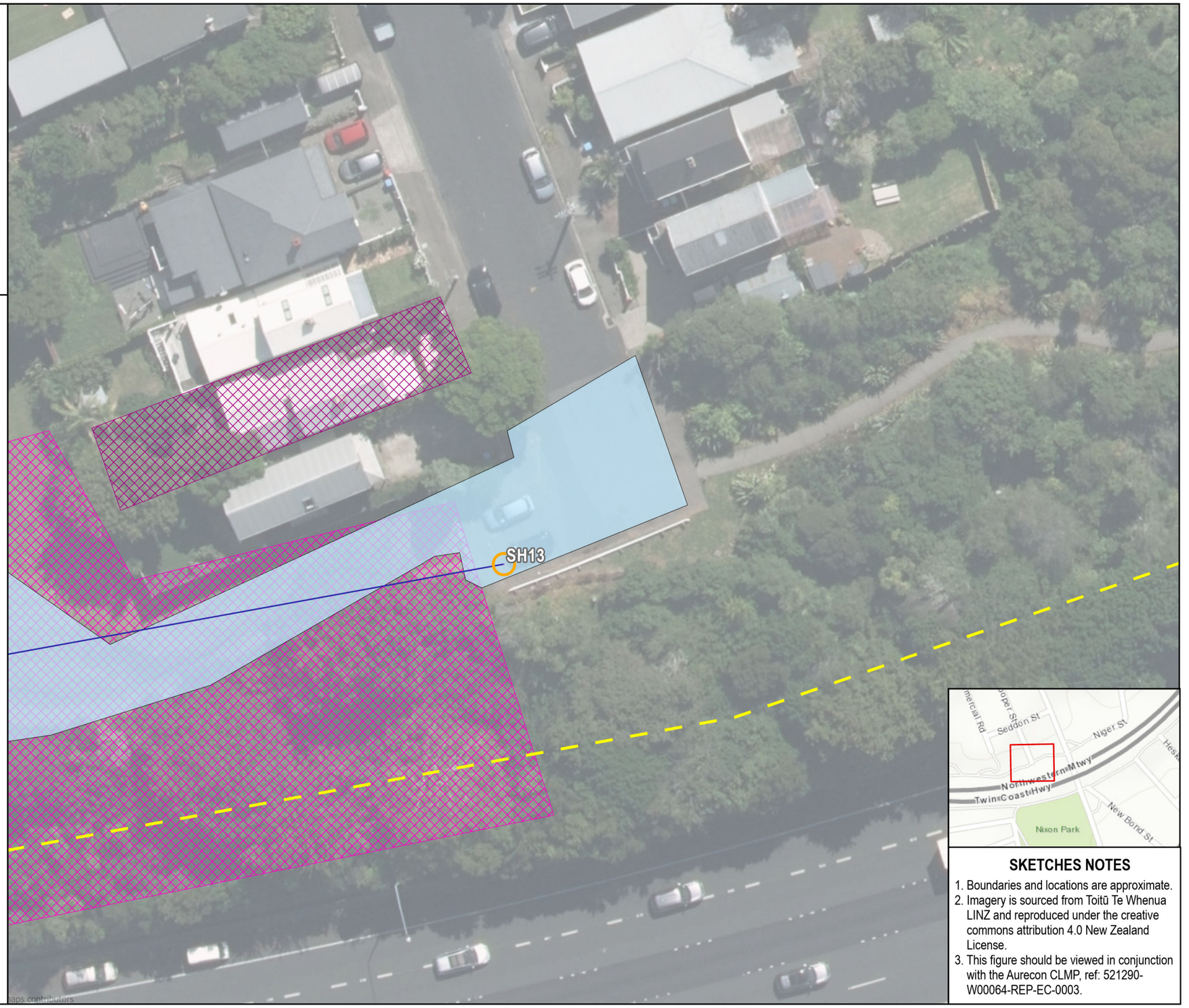
1. **Spoil < 2 m** - Offsite disposal to suitably licenced Class 1 or 2 licenced landfill based on Toxicity Concentration Leaching Potential (TCLP).
2. **Spoil > 2 m** - Suitable for offsite disposal to a cleanfill facility.
3. **Groundwater** - Groundwater is not impacted by concentrations of contaminants that require additional management.
4. **Stormwater** - Not required, if stormwater controls in place while managing spoil removal <2m.

UNEXPECTED CONTAMINATION DISCOVERY PROTOCOL

1. Refer to CLMP Table 6.

CLMP SECTION REFERENCES

1. Refer to **Section 4** for **Site management procedures** relating to consents and plans, site record keeping and monitoring requirements, induction and awareness.
2. Refer to **Section 5** for **Environmental management procedure** relating to excavation, transportation and disposal of spoil, erosion and sediment control and ESCP, stockpiling, dust and odour management controls, groundwater management and dewatering, and imported material.
3. Refer to **Section 6** for **Health and safety controls** relating to site control information required and PPE.



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New Zealand Vertical Datum 2016

0 0.75 1.5 3 4.5 6 7.5 9 m

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H. SUSSEX	
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PROJECT			
WATERCARE SERVICES LIMITED WIWQIP MOTIONS CATCHMENT IMPROVEMENTS			
TITLE			
PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS SHAFT SH13			
DOCUMENT CODE			
521290-W00064-SKT-EC-1013			
SCALE	SIZE	REFERENCE No.	REV
1:350	A3	521290-064	A01

PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS

SHAFT SH14

LEGEND

Potential Contamination Sources
- HAIL H: Contaminant migration
- HAIL I: Release of contaminants
- Not HAIL, potential contamination identified

- Concept Design Alignment
- Permanent shaft
- Approximate construction areas

SUMMARY OF CONTAMINATED MATERIAL MANAGEMENT OPTIONS (TABLE 2, CLMP)

1. General controls for earthworks (spoil handling and disposal requirements) are provided within this CLMP.
2. General controls for groundwater and stormwater provided within this CLMP.

TESTING AND DISPOSAL REQUIREMENTS (TABLE 8, CLMP)

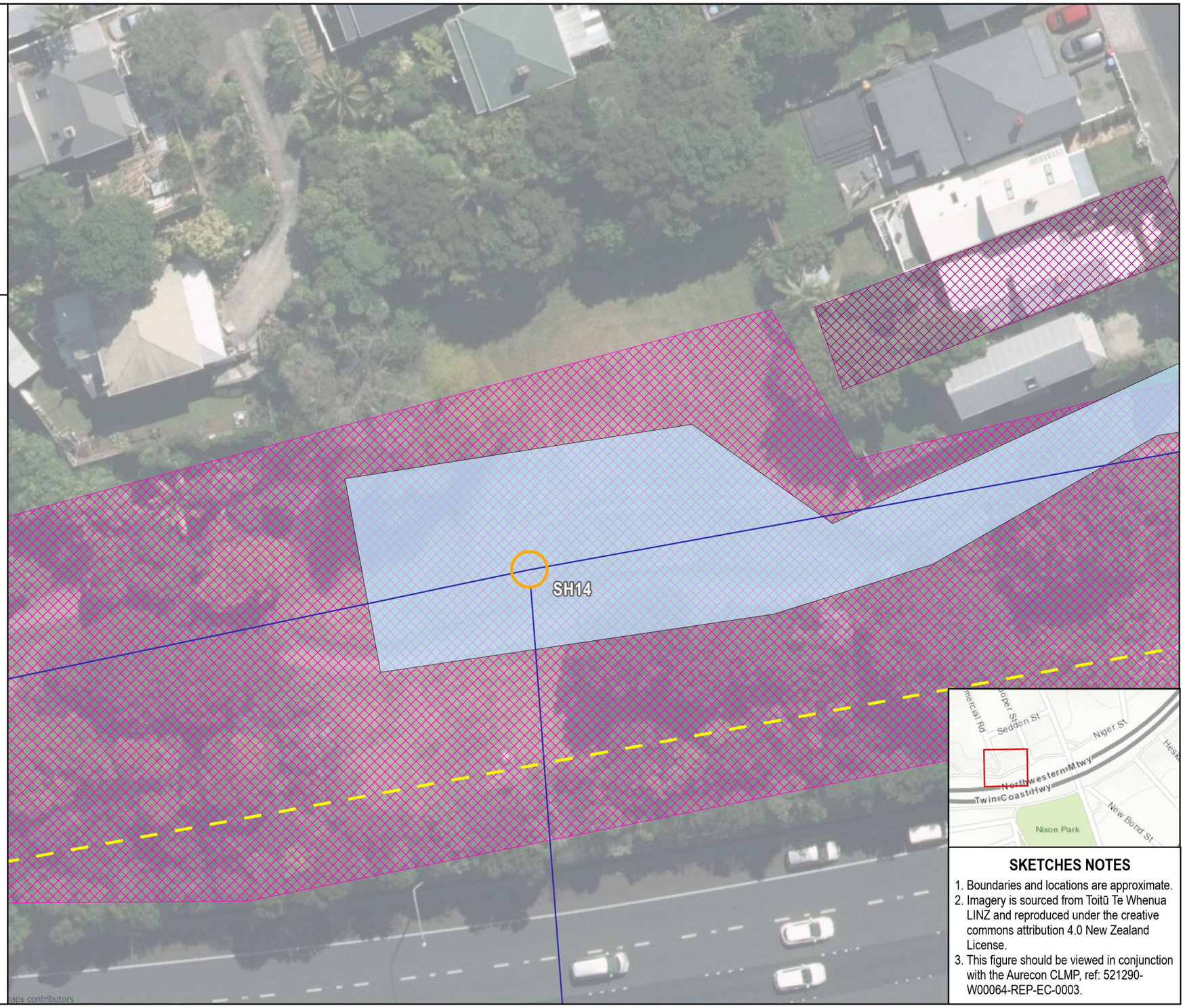
1. **Spoil < 2 m** - Offsite disposal to suitably licenced Class 3 landfill facility.
2. **Spoil > 2 m** - Suitable for offsite disposal to a cleanfill facility.
3. **Groundwater** - Groundwater is not impacted by concentrations of contaminants that require additional management.
4. **Stormwater** - Not required, if stormwater controls in place while managing spoil removal <2m.

UNEXPECTED CONTAMINATION DISCOVERY PROTOCOL

1. Refer to CLMP Table 6.

CLMP SECTION REFERENCES

1. Refer to **Section 4** for **Site management procedures** relating to consents and plans, site record keeping and monitoring requirements, induction and awareness.
2. Refer to **Section 5** for **Environmental management procedure** relating to excavation, transportation and disposal of spoil, erosion and sediment control and ESCP, stockpiling, dust and odour management controls, groundwater management and dewatering, and imported material.
3. Refer to **Section 6** for **Health and safety controls** relating to site control information required and PPE.



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CLIENT: Watercare

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Height Datum: New Zealand Vertical Datum 2016
0 0.75 1.5 3 4.5 6 7.5 9 m
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STATUS	FOR INFORMATION
CODE	S2
DOCUMENT STATE	SHARED
PROJECT	WATERCARE SERVICES LIMITED WIWQIP MOTIONS CATCHMENT IMPROVEMENTS
TITLE	PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS SHAFT SH14
DOCUMENT CODE	521290-W00064-SKT-EC-1014
SCALE	1:350
SIZE	A3
REFERENCE No.	521290-064
REV	A01

PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS

SHAFT SH15

LEGEND

Potential Contamination Sources
- HAIL I: Release of contaminants
- Not HAIL, potential contamination identified

- Concept Design Alignment
- Permanent shaft
- Approximate construction areas

SUMMARY OF CONTAMINATED MATERIAL MANAGEMENT OPTIONS (TABLE 2, CLMP)

1. General controls for earthworks (spoil handling and disposal requirements) are provided within this CLMP.
2. General controls for groundwater and stormwater provided within this CLMP.

TESTING AND DISPOSAL REQUIREMENTS (TABLE 8, CLMP)

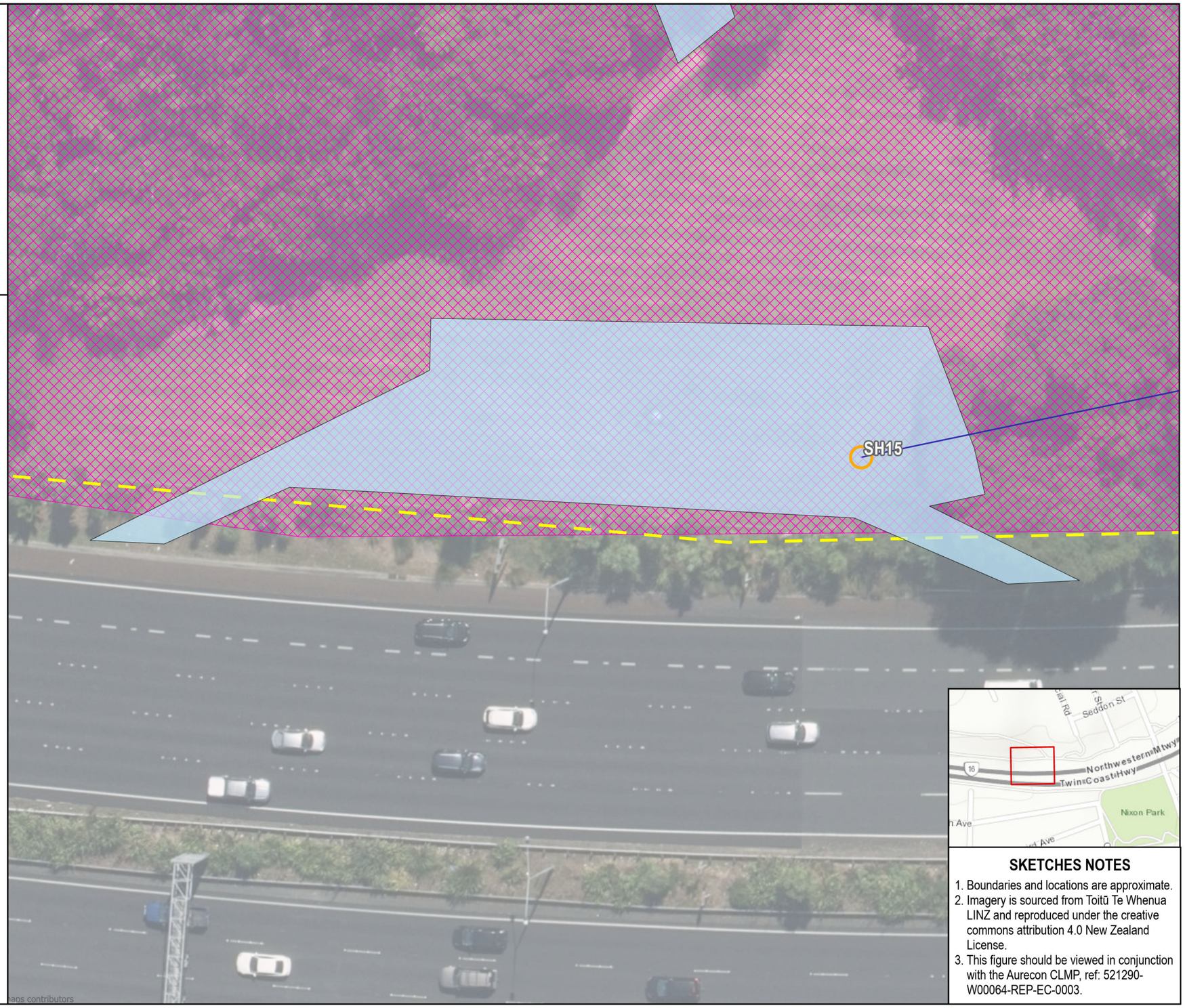
1. **Spoil < 2 m** - Offsite disposal to suitably licenced Class 3 landfill facility.
2. **Spoil > 2 m** - Suitable for offsite disposal to a cleanfill facility.
3. **Groundwater** - Groundwater is not impacted by concentrations of contaminants that require additional management.
4. **Stormwater** - Not required, if stormwater controls in place while managing spoil removal <2m.

UNEXPECTED CONTAMINATION DISCOVERY PROTOCOL

1. Refer to CLMP Table 6.

CLMP SECTION REFERENCES

1. Refer to **Section 4** for **Site management procedures** relating to consents and plans, site record keeping and monitoring requirements, induction and awareness.
2. Refer to **Section 5** for **Environmental management procedure** relating to excavation, transportation and disposal of spoil, erosion and sediment control and ESCP, stockpiling, dust and odour management controls, groundwater management and dewatering, and imported material.
3. Refer to **Section 6** for **Health and safety controls** relating to site control information required and PPE.



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REV	DATE	REVISION DETAILS
A01	2025-06-06	ISSUED FOR INFORMATION

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0 0.75 1.5 3 4.5 6 7.5 9 m

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STATUS	FOR INFORMATION
CODE	S2
DOCUMENT STATE	SHARED

PROJECT	WATERCARE SERVICES LIMITED WIWQIP MOTIONS CATCHMENT IMPROVEMENTS
TITLE	PRINCIPAL CONTRACTOR - CONTAMINATED MATERIALS SPECIFICATIONS SHAFT SH15
DOCUMENT CODE	521290-W00064-SKT-EC-1015

SCALE	SIZE	REFERENCE No.	REV
1:350	A3	521290-064	A01

Attachment B

Roles and responsibilities

Table B1 summarises the recommended roles and assumed responsibilities for the management of contaminated material during earthworks. The Principal Contractor may wish to appoint sub-consultants or contractors to assume certain responsibilities on their behalf. The roles and responsibilities are suggested only but shall be finalised as part of the final CLMP. All identified roles should include clear lines of communication between all key Project stakeholders.

Table B1 Roles and responsibilities

Role	Responsibility
The Client	The Client is the principal for all works and for the purposes of the Health and Safety at Work Act 2015 is the person conducting a business or undertaking (PCBU). The Client is responsible for appointing the Principal Contractor and the Principal Consultant. The Client may elect to appoint a Project manager to represent their interests in addition to these parties.
Principal Consultant	The Principal Consultant is responsible for observing the works to provide reassurance that they are being carried out in accordance with the proposed design and that any variations to the design are documented and fit for purpose. The Principal Consultant is responsible for advising on the need for and reasonableness of any changes to the contract for the works. The Principal Consultant recommends an Environmental Consultant to deliver specialist services related to contaminated land within the CLMP.
Environmental Consultant (Suitably Qualified Environmental Practitioner)	The Environmental Consultant and their nominated Suitably Qualified Experienced Practitioner (SQEP) will be responsible for activities associated with inspection and/or sampling of soil, such as: ■ Identifying areas of potential soil contamination; and ■ Review of soil data and provision of advice with respect to appropriate management and/or off-site disposal of material. The SQEP will be available to provide on-going environmental advice and support to the Earthworks Contractor as needed. Where necessary, the SQEP (with the Site Manager) will be responsible for on-going liaison with regulatory authorities and the community in relation to environmental issues. The role of SQEP is outlined in both the Ministry for the Environment Users' Guide[9] and also the NES. The determination as to who may qualify as a SQEP is defined in the Users' Guide and also by WasteMINZ[10]. The minimum requirements of a SQEP suitable for performing this role as interpreted by WasteMINZ is the following: ■ Accreditation as a Certified Environmental Practitioner Site Contamination Specialist. ■ NES Users' Guide SQEP guidance. ■ Ask your local council for advice.
Principal Contractor	The Principal Contractor for the Project is ultimately responsible for the overall compliance with prescribed legislation and guidelines relevant to the Project. This is the company who hold the contract to complete the physical works. The Principal Contractor is responsible for finalising the CLMP and submitting it for certification by relevant legislative authorities.
Site Manager	The Site Manager will ensure that the appointed Earthworks Contractor (Principal) is prepared to implement environmental protection programmes, appropriate to their activities, and to cooperate in any environmental management plans implemented on the Project. The Site Manager will be the main contact and conduit for ongoing liaison between regulatory authorities. Advice from the Earthworks Contractor may be sought as required. The Site Manager is responsible for ensuring that the works are completed in accordance with the contract.

[9]Ministry for the Environment, 2012, *Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*, ME 1092

[10]https://www.wasteminz.org.nz/wp-content/uploads/2019/11/SQEP-information-for-WasteMINZs-website-12Nov19.pdf/

Attachment C

Asbestos management protocol

The BRANZ guidelines[11] were updated in October 2024 and asbestos works are now classified as:

- '**Asbestos Removal**' and applies when asbestos contaminated soil is excavated and removed from the site. These works are now categorised as Class A, Class B, or two unlicensed categories referred to as [low level asbestos contamination and trace asbestos contamination] based on asbestos concentrations encountered); or
- '**Asbestos-Related Work**' and applies if the asbestos contaminated soil is to remain on-site.

The updated BRANZ Guideline, October 2024 (in particular: *Figure 1. Decision flowchart for work involving asbestos in soil*) shall be referred to establish asbestos management for any site/Project based on nature and complexity of the site/Project. A Suitably Qualified and Experienced Practitioner (SQEP)/licenced asbestos assessor can provide further guidance.

Table C1 below sets out the general requirements/quick guide for a site/Project where asbestos is identified as 'unexpected contamination' or as a result of soil testing outcomes.

Table C1 Asbestos quick guide for information required for each asbestos categories

Categories	General Requirements (refer to BRANZ, 2024 for further details)
Class A Contamination	▪ An Asbestos Removal Control Plan (ARCP) prepared by licenced removalist/ assessor, including addressing the following. – Primary mitigation controls for (PPE, RPE, Dust and decontamination) as stipulated in Table D2 below. – Vehicle assessments by independent assessor or independent competent person, including requirements for vehicle demobilisation, protection (liners and coverings) and air conditioning. – Equipment demobilisation and decontamination. – Notification to WorkSafe. – Air monitoring, as established for the Project by independent assessor. – Off-site disposal records and landfill requirement, if removal from site. – Clearance inspection and certification.
Class B Contamination	▪ An ARCP prepared by licenced removalist/ assessor, including addressing the following: – Primary mitigation controls for (PPE, RPE, Dust and decontamination) as stipulated in Table D2 below. – Vehicle assessments by independent assessor or independent competent person, including requirements for vehicle demobilisation, protection (liners and coverings) and air conditioning. – Equipment demobilisation and decontamination. – Notification to WorkSafe. – Air monitoring, as established for the Project by independent assessor. – Off-site disposal records, if removal from site. – Clearance inspection and certification.

[11] BRANZ, 2024. New Zealand Guidelines for assessing and Managing Asbestos in Soil. Updated October 2024.

Categories	General Requirements (refer to BRANZ, 2024 for further details)
Low Level Asbestos Contamination	▪ Works in accordance with this For Construction – CSMP, including: – Remedial Action Plan (RAP) or Remedial Work Instruction (RWI). – Primary mitigation controls for (PPE, RPE, Dust and decontamination) stipulated in Table D2. – Visual assessment of trucks (including truck covering) by a competent person or SQEP[12]. – Off-site disposal records, if removal from site. – Equipment decontamination.
Trace Asbestos Contamination	▪ Works in accordance with this For Construction – CSMP, including: – Remedial Action Plan (RAP) or Remedial Work Instruction (RWI). – Primary mitigation controls for (PPE, RPE, Dust and decontamination) stipulated in Table D2. – Visual assessment of trucks (including truck covering) by a competent person or SQEP. – Off-site disposal records, if removal from site. – Equipment decontamination.

Table C2 provide the required control requirements for the proposed works (Primary Mitigation Control Requirements for Work Involving Asbestos[13]. Should conditions significantly change or should a change in works Classification be established the controls required will need to be reassessed by the SQEP.

Table C2 Primary mitigation control requirements for work involving asbestos

Scenario	PPE	Respiratory protective equipment (RPE)	Dust/asbestos fibre suppression	Decontamination Facilities
Class A Contamination **>1% FA/AF (soil)** ***>0.01 f/ML (air)***	Disposable coveralls rated type 5, category 3, nitrile gloves, steel toe capped gumboots or safety footwear with disposable overshoes.	Full-face P3 respirator with particulate filter. Consider increasing to power-assisted if required.	Water and asbestos-encapsulating polymer emulsion product applied before starting work and during as required. Consider adding a surfactant to water for amphibole fibres (brown and blue).	Basic disposable wet decontamination tent or trailer. Consider powered and plumbed decontamination unit if Project scale warrants.
Class B Contamination **>0.01% FA/AF (soil)** **>1% w/w ACM (soil)** ***>0.01 f/ML (Air)***		Half-face P3 respirator with particulate filter. Consider increasing to full-face if friable ACM present.		Basic disposable decontamination tent and foot wash.

[12] A competent person under the Health and Safety at Work (Asbestos) Regulations, 2016 (Asbestos Regulations) is a person who has acquired, through training and experience, the knowledge and experience of relevant asbestos removal industry practice.
[13]BRANZ, 2024. New Zealand Guidelines for assessing and Managing Asbestos in Soil. Updated October 2024.

Scenario	PPE	Respiratory protective equipment (RPE)	Dust/asbestos fibre suppression	Decontamination Facilities
Low Level Asbestos Contamination **>0.001% FA/AF (Soil)** **>0.01% ACM (Soil)** **≤0.01% f/ML (air)**		Disposable P2 dust mask.	Water via localised points. Addition of surfactants and polymers where the location is sensitive (such as adjacent to busy centres, schools). Temporary cover of contaminated area awaiting remediation.	
Trace Asbestos Contamination **≤0.001% FA/AF (soil)** **≤0.01%ACM** **≤0.01% f/ML (air)**	No asbestos-specific RPE if SQEP confirms unlikely to exceed trace levels in air monitoring (0.01 f/ml) and/or if air monitoring confirms asbestos below 0.01 f/ml.	No asbestos-specific RPE if SQEP confirms unlikely to exceed trace levels in air monitoring (0.01 f/ml) and/or if air monitoring confirms asbestos below 0.01 f/ml.		Foot wash and used PPE collection area.

Attachment D

Gas vapour and hot works protocol

Based on the findings of the PSI and Site Contamination Assessment Report, it is unlikely that gas/vapour generation and air quality monitoring during soil disturbance will be required for the site. This section has been included in the event 'unexpected contamination' is encountered during soil excavations and the potential monitoring required.

Monitoring of air quality will be determined by the SQEP to identify if potential health and safety risks are present during soil disturbance. If risks are confirmed, ambient air quality monitoring within the worker breathing zone should be conducted for the duration of the soil disturbance activities using a photo-ionisation detector (PID) with readings recorded hourly. The location of the PID will reflect the areas at highest risk of gas/vapour generation and with workers present.

The PID must be calibrated daily using isobutylene and this will provide a semi-quantitative assessment of the combined concentration of ionisable volatile contaminants in isobutylene equivalents.

Where PID values are between 1 – 5ppm, readings must be recorded every 15 minutes. Where PID values are above the Short-Term Exposure Limit (STEL), work must cease, and corrective action must be taken. Examples of corrective actions are detailed in Table D1, and Workplace Exposure Standards can be found in *WorkSafe 2019.*

Table D1 Breathing zone monitoring – health action levels

VOC Levels	Qualitative Risk Evaluation	Example Actions
0-1 ppm	Low risk to personnel in breathing zone	Continue monitoring the breathing zone recording results every hour.
1-5 ppm	Medium risk to personnel in breathing zone	Stop work and alert personnel in breathing zone. Identify and implement mitigation measures (e.g. cover exposed soil, move upwind, don RPE). Continue monitoring the breathing zone, recording results every 15 minutes.
>5 ppm	High risk to personnel in breathing zone	Stop work, leave the area and do not return until a risk management and control plan has been established has been performed and appropriate PPE/RPE is donned

Hot work monitoring

If applicable for the site, hot work includes any activity or task that may cause an ignition or flammable or combustible gas or vapours, and includes the use of welders, oxy-acetylene equipment, concrete cutting, and any electrical equipment that does not have an intrinsically safe rating for that environment. In addition, monitoring for parameters such as the lower explosive limit (LEL), methane, oxygen and CO levels may be necessary, Table D2 details hot work action levels.

Table D2 Hot work action levels

LEL Concentration (%)	Action
<1	Hot work may continue
1 – 5	Cease hot work and take corrective action to reduce concentration of flammable gas or vapour
>5	Cease all work, make equipment safe and evacuate site

Attachment E
Soil classification

A contaminated site is a site where hazardous substances occur at a level which could cause an immediate or long-term hazard to human health and/or the environment. With regards to soil management, there are four basic categories:

- Contamination is present above human health guideline values or contaminant standards.
- Contamination is present above ecological guideline values.
- Possible contamination is present above guideline values or contaminant standards.
- No contamination is present above guideline values.

Site soil should be managed in accordance with their known or suspected level of contamination to mitigate any risks posed to the environment or human health.

Table E1 Soil classification

Classification	Definition
Clean fill material (Class 5 landfill)	Defined by Technical Guidelines for Disposal to Land (2023): Virgin excavated natural materials (VENM) such as clay, soil and rock that are free of: ■ Combustive, putrescible, degradable, or leachable components. ■ Hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown. ■ Products or materials derived from hazardous waste treatment, stabilisation or disposal practices. ■ Materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health if excavated. ■ Contaminated soil and other contaminated materials. ■ Liquid waste. In simpler terms, cleanfill includes materials such as uncontaminated soil, cured asphalt, brick, unreinforced concrete, fibre cement building products (excluding asbestos) and glass. Non-cleanfill materials would include soil with results showing exceedances of regional background concentrations of metals, asphalt (new), green waste and household refuse. Waste soil meeting cleanfill criteria and requiring removal from site is able to be disposed of in landfill permitted for the acceptance of cleanfill.
Controlled fill (Class 4 landfill)	Controlled fill consists of inert material (e.g., selected inert construction or demolition material) or soils with trace element concentrations greater than applicable regional background concentrations. The material source includes selected materials from construction sites and demolition sites and earthworks.
Managed fill (Class 3 landfill)	Managed fill consists of inert material (e.g., selected inert construction or demolition material) or soils with trace element concentrations greater than applicable regional background concentrations. The material source includes selected materials from C&D sites, earthworks and site remediation.
C&D landfill (Class 2 landfill)	Construction and demolition (C&D) landfills consist of unsorted and uncontrolled C&D material. The material source includes construction sites, demolition material and soil from areas with significantly different chemical properties.
Landfills (Class 1 landfill)	Landfills consist of non-hazardous waste which is typically mixed waste from multiple sources and containing a high content of organic material. It may include waste cited for classes 2, 3, 4 and 5. The material source is from households, industry, institutions, construction sites and contaminated sites.

Attachment F
DSI analytical results and laboratory reports

Project: WIWQIP Motions Catchment Improvement
Client: Watercare
Aurecon ref: 521290-064

aurecon

		Metals							Asbestos					Polycyclic Aromatic Hydrocarbons																				TPH			
		Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Nickel	Zinc	^Asbestos as Asbestos Fines (AF) as % of Total Sample	Asbestos as Fibrous Asbestos (FA) as % of Total Sample	^Combined FA + AF as % of total Sample	^Asbestos in ACM as % of total Sample	Asbestos Form	Detected Asbestos Type	Methylnaphthalene	Dimethylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(a)pyrene Potency Equivalency Factor (PEF) NES	Benzo(a)pyrene Toxic Equivalence (TEF)	Benzo(b)fluoranthene + Benzo(j)fluoranthene	Benzo(b)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Perylene	Phenanthrene	Pyrene	PAHs (Sum of total)	C7-C9	C10-C14	C15-C36	C7-C36
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	% w/w	% w/w	% w/w	% w/w	-	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg dry	mg/kg dry	mg/kg dry w	mg/kg dry 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
NESCS and NEPM (for Ni, Zn only) - Commercial / Industrial [A,B]		70	1,300[#1]	6,300[#2]	10,000[#3]	3,300[#4]	6,000	400,000	-	-	-	-	-	-	-	-	-	-	-	-	-	35[#5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria. [C]		100	7.5	400[#8]	325	250	105	400	-	-	-	-	-	-	-	-	-	-	-	-	20[#9]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils. [D]		12	0.65	125[#10]	90	65[#11]	320	1,160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class 3 Managed Fill Waste Acceptance Criteria [E]		140	10	150	280	460	320	1,200	-	-	-	-	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	500	-	-
Module 4, Tier 1 Maintenance Workers (SAND) [F]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25[#6]	-	-	-	-	-	-	-	-	-	640	-	-	-	120	6,500	-	-
Module 4, Tier 1 GW 2m (CLAY) >=0m, <1m [G]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.85[#6]	-	-	-	-	-	-	-	-	-	0.043	-	-	1.2	590[#13]	1,400[#13]	-	-
Module 4, Tier 1 GW 2m (SANDY SILT) >=0m, <1m [G]		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	-	-	-	-	-	-	-	-	-	0.28	-	-	7.9	5,200[#13]	9,200[#13]	-	-
NZ GAMAS (Asbestos) Commerical and industrial [H]		-	-	-	-	-	-	-	-	-	0.001	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Lab Report No.	Field ID + Depth (m)	Location	Characterising	Matrix Type	Matrix Description	Sample date																																				
3664138 + 3658961	BH06_0.4-0.5	Suffolk Reserve	Shaft SH02	Soil	SILT (Fill)	29 08 2024	5	<0.10	22	26	89	22	68	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.014	<0.014	0.040	0.057	0.22	0.35	0.49	0.49	0.36	0.199	0.27	0.141	0.20	0.041	0.44	<0.014	0.27	<0.07	0.092	0.129	0.51	3.4	<20	<20	<40	<80
3664138	BH06_1.4-1.5	Suffolk Reserve	Shaft SH02	Soil	SILT (Fill)	29 08 2024	3	<0.10	23	35	35	8.9	5	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3620390 + 3621286	BH10_0.4-0.5	Mostyn Street	Shaft SH03	Soil	SILT (Fill)	04 07 2024	5	0.15	23	31	56	26	90	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	0.028	0.045	0.167	0.25	0.35	0.35	0.25	0.149	0.179	0.100	0.169	0.032	0.40	0.013	0.169	<0.07	0.062	0.160	0.48	2.7	<20	<20	<40	<80
3620390 + 3621286	BH10_1.0-1.1	Mostyn Street	Shaft SH03	Soil	SILT (Fill)	04 07 2024	7	0.11	21	14	42	12	98	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.014	<0.014	0.017	0.031	0.181	0.25	0.37	0.36	0.28	0.146	0.175	0.108	0.179	0.032	0.45	<0.014	0.169	<0.07	0.062	0.176	0.44	2.7	<20	<20	<40	<80
3624078	BH10_1.8-1.9	Mostyn Street	Shaft SH03	Soil	Sandy SILT (Natural)	05 07 2024	3	<0.10	18	14	34	15	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624078	BH10_3.3-3.4	Mostyn Street	Shaft SH03	Soil	Clayey SILT (Natural)	05 07 2024	<2	<0.10	11	11	28	9	56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624078	BH10_5.9-6.0	Mostyn Street	Shaft SH03	Soil	Clayey SILT (Natural)	05 07 2024	<2	<0.10	24	16	9.2	14	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624078	BH10_9.4-9.5	Mostyn Street	Shaft SH03	Soil	Sandstone (Natural)	05 07 2024	<2	<0.10	20	15	7.2	20	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3626399 + 3625593	BH13_0.4-0.5	New Bond Street	-	Soil	Silty CLAY (Fill)	10 07 2024	5	<0.10	40	36	187	35	85	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.03	<0.014	0.024	0.016	0.128	0.190	0.28	0.27	0.22	0.112	0.145	0.077	0.104	0.027	0.22	<0.014	0.142	<0.07	0.042	0.059	0.25	1.8	<20	<20	<40	<80
3625593	BH13_1.4-1.5	New Bond Street	-	Soil	Silty CLAY (Natural)	10 07 2024	3	<0.10	24	9	6.8	5	14	-	-	-	-	-	-	<0.015	<0.03	<0.015	<0.015	<0.015	<0.015	<0.015	<0.038	<0.038	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.08	<0.015	<0.015	<0.015	<0.4	<30	<20	<40	<90
3634409	BH21_11.0-11.1	Finch Street	Shaft SH06	Soil	Sandstone (Natural)	22 07 2024	2	<0.10	12	10	4.3	11	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH21_16.4-16.5	Finch Street	Shaft SH06	Soil	Sandstone (Natural)	22 07 2024	3	<0.10	13	11	5.1	10	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH21_5.4-5.5	Finch Street	Shaft SH06	Soil	Silty SAND (Natural)	22 07 2024	4	<0.10	8	14	6.6	9	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3590857	BH22_0.2-0.3	Finch Street	-	Soil	Sandy SILT (Fill)	22 05 2024	6	0.10	28	23	199	55	74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3590857	BH22_0.6	Finch Street	-	Soil	CLAY (Fill)	22 05 2024	7	<0.10	9	3	11.6	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3658963 + 3658961	BH25_0.2-0.3	Myrtle Street	Shaft SH07	Soil	Sandy SILT (Fill)	26 08 2024	3	<0.10	26	30	21	48	35	<0.001	<0.001	<0.001	<0.001	-	Not Detected	0.030	0.019	0.195	0.025	0.85	1.73	1.78	2.6	2.6	1.81	0.97	1.06	0.71	1.59	0.23	3.7	0.23	1.10	<0.08	0.41	2.8	4.0	23	<30	<20	141	143
3658963	BH25_1.5-1.6	Myrtle Street	Shaft SH07	Soil	CLAY (Natural)	26 08 2024	3	<0.10	11	5	12.4	3	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3620390 + 3621286	BH29_0.05-0.2	736 Great North Road	-	Soil	SILT (Fill)	04 07 2024	12	0.32	43	52	69	80	122	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.03	<0.014	<0.014	<0.014	0.110	0.26	0.35	0.35	0.23	0.135	0.164	0.091	0.102	0.030	0.111	<0.014	0.155	<0.07	0.063	0.020	0.170	1.6	-	-	-	-
3582989 + 3583099	BH30_0.23	Western Springs Park	-	Soil	Sandy SILT (Fill)	13 05 2024	12	0.12	26	20	31	23	53	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.03	<0.014	<0.014	<0.014	0.110	0.26	0.35	0.35	0.23	0.135	0.164	0.091	0.102	0.030	0.111	<0.014	0.155	<0.07	0.063	0.020	0.170	1.6	-	-	-	-
3582989 + 3583099	BH30_0.62	Western Springs Park	-	Soil	CLAY (Fill)	13 05 2024	<2	<0.10	22	5	8.1	9	20	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.015	<0.03	<0.015	<0.015	<0.015	<0.015	<0.015	<0.035	<0.035	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.08	<0.015	<0.015	<0.015	<0.4	-	-	-	-
3634409	BH35_3.4-3.5	Ophir Street	Shaft SH09	Soil	Silty CLAY (Fill)	22 07 2024	24	0.11	38	31	46	94	15	-	-	-	-	-	-	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.035	<0.035	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016	<0.08	<0.016	<0.016	<0.016	<0.4	<30	<20	<40	<90
3634409	BH35_4.0-4.1	Ophir Street	Shaft SH09	Soil	Clayey SILT (Natural)	22 07 2024	11	9	9	21	5.9	64	118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3629193 + 3629428	BH39_0.5-0.6	Burgoyne Street	Shaft SH11	Soil	Silty CLAY (Fill)	16 07 2024	70	<0.10	12	10	54	9	21	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.030	<0.030	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013	<0.013	<0.3	<20	<20	<40	<80
3629193	BH39_1.0-1.1	Burgoyne Street	Shaft SH11	Soil	Silty CLAY (Fill)	16 07 2024	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3629193	BH39_1.5-1.6	Burgoyne Street	Shaft SH11	Soil	CLAY (Natural)	16 07 2024	4	<0.10	22	21	10.3	<2	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_12.0-12.45	Burgoyne Street	Shaft SH11	Soil	Siltstone (Natural)	22 07 2024	5	<0.10	22	25	7.7	18	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_3.0-3.45	Burgoyne Street	Shaft SH11	Soil	CLAY (Natural)	22 07 2024	4	<0.10	15	33	10.9	5	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_6.0-6.45	Burgoyne Street	Shaft SH11	Soil	Siltstone (Natural)	22 07 2024	4	<0.10	20	30	8.2	57	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_9.0-9.45	Burgoyne Street	Shaft SH11	Soil	Siltstone (Natural)	22 07 2024	5	<0.10	16	31	8.8	20	69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482 + 3651494	BH44_0.3-0.4	Basque Park	Shaft SH12A	Soil	Clayey SILT (Landfill)	14 08 2024	3	0.17	15	16	54	14	61	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	<0.013	<0.013	0.050	0.073	0.105	0.104	0.079	0.042	0.053	0.027	0.046	<0.013	0.107	<0.013	0.052	<0.07	0.017	0.034	0.118	0.7	<20	<20	<40	<80
3651482 + 3651494	BH44_1.1-1.2	Basque Park	Shaft SH12A	Soil	Clayey SILT (Landfill)	14 08 2024	4	<0.10	22	22	45	18	47	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.016	<0.016	<0.016	<0.016	<0.016	0.073	0.096	0.138	0.137	0.109	0.058	0.065	0.036	0.070	<0.016	0.168	<0.016	0.063	<0.08	0.023	0.088	0.168	1.1	<30	<20	<40	<90
3651482	BH44_10.5-10.6	Basque Park	Shaft SH12A	Soil	Sandstone (Natural)	15 08 2024	2	<0.10	27	16	5.4	14	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482 + 3651494	BH44_3.0-3.4	Basque Park	Shaft SH12A	Soil	Clayey SILT (Landfill)	15 08 2024	<2	<0.10	18	6	15.3	5	41	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	<0.013	<0.013	0.014	0.024	0.031	0.030	0.027	0.014	0.018	<0.013	0.015	<0.013	0.039	<0.013	0.017	<0.07	<0.013	0.017	0.038	<0.3	<20	<20	<40	<80
3651482	BH44_6.0-6.3	Basque Park	Shaft SH12A	Soil	Clayey SILT (Natural)	15 08 2024	<2	<0.10	24	11	6.1	12	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3655466 + 3655467	BH45_0.8-1.0	Basque Park	Shaft SH12	Soil	Clayey SILT (Landfill)	19 08 2024	5	0.10	22	26	47	18	80	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	0.027	0.023	0.147	0.125	0.22	0.21	0.21	0.20	0.165	0.080	0.140	0.028	0.36	<0.013	0.154	<0.07	0.053	0.093	0.38	2.2	<20	<20	<40	<80
3655466 + 3655467	BH46_0.4-0.5	Basque Park	Shaft SH12	Soil	Clayey SILT (Landfill)	19 08 2024	3	<0.10	21	16	27	12	41	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	0.037	0.051	0.21	0.173	0.30	0.30	0.30	0.28	0.22	0.115	0.21	0.039	0.58	0.013	0.21	<0.07	0.072	0.196	0.56	3.3	<20	<20	<40	<80
3655466 + 3655467	BH46_1.4-1.6	Basque Park	Shaft SH12	Soil	Clayey SILT (Landfill)	19 08 2024	3	<0.10	20	16	16.7	12	43	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	<0.013	<0.013	0.016	0.013	<0.030	<0.030	0.024	0.021	0.018	<0.013	0.015	<0.013	0.047	<0.013	0.016	<0.07	<0.013	0.013	0.047	<0.3	<20	<20	<40	<80
3658963	BH46_12.0-12.1	Basque Park	Shaft SH12	Soil	Sandstone (Natural)	23 08 2024	<2	<0.10	28	19	4.4	15	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3658963 + 3670623	BH46_3.5-3.6	Basque Park	Shaft SH12	Soil	Sandy SILT (Landfill)	23 08 2024	5	<0.10	24	22	75	18	65	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	0.121	0.25	0.76	0.77	1.12	1.11	0.80	0.43	0.46	0.32	0.66	0.098	1.79	0.050	0.46	<0.07	0.172	0.76	1.75	9.7	<20	<20	<40	<80
3658963	BH46_8.5-8.7	Basque Park	Shaft SH12	Soil	Sandstone (Natural)	23 08 2024	3	<0.10	19	19	5.6	19	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3620390 + 3621286	BH48_0.05-0.2	Copper Street	Shaft SH13	Soil	SILT (Fill)	04 07 2024	6	0.44	19	35	900	18	310	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.030	<0.030	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.07	<0.013	<0.013	<0.013	<0.3	<20	<20	<40	<80
3634409	BH48_3.0-3.1	Copper Street	Shaft SH13	Soil	Siltstone (Natural)	22 07 2024	3	<0.10	16	15	5.3	24	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH48_6.5-6.7	Copper Street	Shaft SH13	Soil	Sandstone (Natural)	22 07 2024	3	<0.10	25	15	5.0	25	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624327	BH49_0.05-0.2	Arch Hill Reserve	Shaft SH14	Soil	SILT (Fill)	08 07 2024	9	0.18	24	40	99	50	120	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.014	0.020	0.142	0.21	1.18	1.69	2.4	2.4	1.78	1.02	1.22	0.70	1.11	0.22	2.3	0.031	1.19	<0.07	0.43	0.69	2.7	16.8	<20	<20	110	142
3624327	BH49_0.3-0.4	Arch Hill Reserve	Shaft SH14	Soil	SILT (Fill)	08 07 2024	5	0.14	18	28	98	23	112	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.014	0.014	0.028	0.067	0.34	0.43	0.63	0.62	0.45	0.25	0.33	0.171	0.39	0.057	0.78	0.013	0.28	<0.07	0.101	0.28	0.85	4.9	<20	<20	<40	<80
3634409	BH49_2.7-2.8	Arch Hill Reserve	Shaft SH14	Soil	Silty CLAY (Natural)	22 07 2024	2	<0.10	19	12	4.8	3	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH49_5.0-5.1	Arch Hill Reserve	Shaft SH14	Soil	CLAY (Natural)	22 07 2024	<2	<0.10	19	18	6.6	<2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH49_5.9-6.0	Arch Hill Reserve	Shaft SH14	Soil	Sandstone (Natural)	22 07 2024	2	<0.10	20	13	4.4	12	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624326	BH49_B1 0.35	Arch Hill Reserve	Shaft SH14	Bulk	Fibre Board	08 07 2024	-	-	-	-	-	-	-	-	-	-	-	Fibre Board	Amosite (Brown), Chrysotile (White)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482 + 3651494	BH51_0.5-0.6	Arch Hill Reserve	Shaft SH15	Soil	SILT (Fill)	15 08 2024	4	<0.10	27	34	62	48	65	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.013	<0.013	<0.013	<0.013	<0.013	0.057	0.066	0.100	0.099	0.083	0.038	0.043	0.032	0.050	<0.013	0.103	<0.013	0.051	<0.07	0.024	0.017	0.110	0.7	<20	<20	<40	<80
3634409	BH49_2.7-2.8	Arch Hill Reserve	Shaft SH14	Soil	Silty CLAY (Natural)	22 07 2024	2	<0.10	19	12	4.8	3	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683703	BH43_2.3	Fleet Street	Shaft SH12A	Soil	SILT (Fill)	24 09 2024	<2	<0.10	35	23	17.2	14	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3674838 + 3674826	BH14_0.6-0.7	Nixon Park Carpark	Shaft SH04	Soil	CLAY (Fill)	16 09 2024	8	<0.10	23	18	114	24	46	<0.001	<0.001	<0.001	<0.001	-	Not Detected	<0.014	<0.014	<0.014	0.019	0.026	0.175	0.25	0.36	0.35	0.23	0.134	0.180	0.102	0.164	0.033	0.33	<0.014	0.168	<0.07	0.063	0.110	0.41	2.4	<20	<40	<80	<20
3683703	BH14_2.5-2.6	Nixon Park Carpark	Shaft SH04	Soil	SILT (Natural)	30 09 2024	<2	<0.10	7	2	3.7	<2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683703	BH14_10.0-10.1	Nixon Park Carpark	Shaft SH04	Soil	Sandstone (Natural)	30 09 2024	2	<0.10	20	10	3.9	10	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3674838 + 3674826	BH38_1.1-1.2	Gundry Street	Shaft SH10	Soil	SILT (Natural)	18 09 2024	<2	<0.10	7	4	16.9	2	10	<0.001	<0.001	<0.001	<0.001	-	Not Detected	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.3	<1.3	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<20	<40	<80	<20
3694107	BH38_6.9-7.0	Gundry Street	Shaft SH10	Soil	Siltstone (Natural)	15 10 2024	4	<0.10	18	27	8.1	18	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

#1 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
#2 Value for hexavalent chromium
#3 No limit. Derived value exceeds 10,000 mg/kg.
#4 Value is for inorganic lead
#5 Value is for BaP TEQ. Refer NES Users' Guide for notes.
#6 The SCS value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dieldrin if both are involved.
#7 DDT (as the sum of DDT and its metabolites DDD and DDE)
#8 Value is for total chromium
#9 Value is for benzo (a) pyrene (equivalent)
#10 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.
#11 Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.
#12 Value for total xylene (o, m and p)
#13 Residual Separate Phase Hydrocarbons (RSPH)

Environmental Standards
A - Ministry for the Environment, 2012, NESCS - Commercial / Industrial
B - NEPC, 2013, NEPM (Ni,Zn only) - Commercial/ Industrial
C - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.
D - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.
E - wasteMINZ, September 2023, Class 3 Managed Fill Waste Acceptance Criteria
F - Ministry for the Environment, August 1999, Module 4, Tier 1 Maintenance worker (SAND)
G - Ministry for the Environment, August 1999, Module 4, Tier 1 GW 2m (CLAY)/(SANDY SILT)
H - BRANZ, 2017, NZ GAMAS (Asbestos) Commercial/ industrial

Project: WIWQIP Motions Catchment Improvement
Client: Watercare
Aurecon ref: 521290-064

aurecon

	BTEX					Organochlorine Pesticides																				SVOCs									
	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylenes (m & p)	Aldrin	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	Chlordane (cis)	Chlordane (trans)	DDD	o,p-DDD	o,p'-DDE	4,4-DDE	4,4'-DDT	2,4-DDT	Endosulfan I	Dieldrin	Endosulfan II	Endrin	Endosulfan sulphate	Endrin ketone	Endrin aldehyde	Heptachlor	Methoxychlor	Heptachlor epoxide	1&2-Chloronaphthalene	Di(2-ethylhexyl)adipate	N-Nitrosodiphenylamine + Diphenylamine	Carbazole	Isophorone	4-bromophenyl phenyl ether	4-chlorophenyl phenyl ether	Benzyl alcohol	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	Dibenzofuran
	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 dry w	mg/kg	mg/kg dry w	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NESCS and NEPM (for Ni, Zn only) - Comm	-	-	-	-	-	160[#6]	-	-	-	-	-	-	-	-	-	-	1,000[#7]	-	-	160[#6]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auckland Unitary Plan - Chapter E30 - Permitt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12[#7]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auckland Unitary Plan - Chapter E30 - Backgrou	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class 3 Managed Fill Waste	0.11	19	10	25[#12]	25[#12]	-	-	-	-	-	-	-	-	-	-	-	2[#7]	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Module 4, Tier 1 Maintenan	3	94	670	150[#12]	150[#12]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Module 4, Tier 1 GW 2m (	0.0054	1	1.1	0.61[#12]	0.61[#12]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Module 4, Tier 1 GW 2m (SANDY	0.029	6	7.2	3.7	3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NZ GAMAS (Asbestos) Comm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Lab Report No.	Field ID + Depth (m)	Location	Characterising	Matrix Type	Matrix Description																																				
3664138 + 3658961	BH06_0.4-0.5	Suffolk Reserve	Shaft SH02	Soil	SILT (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3664138	BH06_1.4-1.5	Suffolk Reserve	Shaft SH02	Soil	SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3620390 + 3621286	BH10_0.4-0.5	Mostyn Street	Shaft SH03	Soil	SILT (Fill)	<0.06	<0.06	<0.06	<0.06	<0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3620390 + 3621286	BH10_1.0-1.1	Mostyn Street	Shaft SH03	Soil	SILT (Fill)	<0.07	<0.07	<0.07	<0.07	<0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624078	BH10_1.8-1.9	Mostyn Street	Shaft SH03	Soil	Sandy SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624078	BH10_3.3-3.4	Mostyn Street	Shaft SH03	Soil	Clayey SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624078	BH10_5.9-6.0	Mostyn Street	Shaft SH03	Soil	Clayey SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624078	BH10_9.4-9.5	Mostyn Street	Shaft SH03	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3626399 + 3625593	BH13_0.4-0.5	New Bond Street	-	Soil	Silty CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3625593	BH13_1.4-1.5	New Bond Street	-	Soil	Silty CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH21_11.0-11.1	Finch Street	Shaft SH06	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH21_16.4-16.5	Finch Street	Shaft SH06	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH21_5.4-5.5	Finch Street	Shaft SH06	Soil	Silty SAND (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3590857	BH22_0.2-0.3	Finch Street	-	Soil	Sandy SILT (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3590857	BH22_0.6	Finch Street	-	Soil	CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3658963 + 3658961	BH25_0.2-0.3	Myrtle Street	Shaft SH07	Soil	Sandy SILT (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3658963	BH25_1.5-1.6	Myrtle Street	Shaft SH07	Soil	CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3620390 + 3621286	BH29_0.05-0.2	736 Great North Road	-	Soil	SILT (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3582989 + 3583099	BH30_0.23	Western Springs Park	-	Soil	Sandy SILT (Fill)	-	-	-	-	-	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014
3582989 + 3583099	BH30_0.62	Western Springs Park	-	Soil	CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH35_3.4-3.5	Ophir Street	Shaft SH09	Soil	Silty CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH35_4.0-4.1	Ophir Street	Shaft SH09	Soil	Clayey SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3629193 + 3629428	BH39_0.5-0.6	Burgoyne Street	Shaft SH11	Soil	Silty CLAY (Fill)	<0.06	<0.06	<0.06	<0.06	<0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3629193	BH39_1.0-1.1	Burgoyne Street	Shaft SH11	Soil	Silty CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3629193	BH39_1.5-1.6	Burgoyne Street	Shaft SH11	Soil	CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_12.0-12.45	Burgoyne Street	Shaft SH11	Soil	Siltstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_3.0-3.45	Burgoyne Street	Shaft SH11	Soil	CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_6.0-6.45	Burgoyne Street	Shaft SH11	Soil	Siltstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH39_9.0-9.45	Burgoyne Street	Shaft SH11	Soil	Siltstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482 + 3651494	BH44_0.3-0.4	Basque Park	Shaft SH12A	Soil	Clayey SILT (Landfill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482 + 3651494	BH44_1.1-1.2	Basque Park	Shaft SH12A	Soil	Clayey SILT (Landfill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482	BH44_10.5-10.6	Basque Park	Shaft SH12A	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482 + 3651494	BH44_3.0-3.4	Basque Park	Shaft SH12A	Soil	Clayey SILT (Landfill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482	BH44_6.0-6.3	Basque Park	Shaft SH12A	Soil	Clayey SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3655466 + 3655467	BH45_0.8-1.0	Basque Park	Shaft SH12	Soil	Clayey SILT (Landfill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3655466 + 3655467	BH46_0.4-0.5	Basque Park	Shaft SH12	Soil	Clayey SILT (Landfill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3655466 + 3655467	BH46_1.4-1.6	Basque Park	Shaft SH12	Soil	Clayey SILT (Landfill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3658963	BH46_12.0-12.1	Basque Park	Shaft SH12	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3658963 + 3670623	BH46_3.5-3.6	Basque Park	Shaft SH12	Soil	Sandy SILT (Landfill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3658963	BH46_8.5-8.7	Basque Park	Shaft SH12	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3620390 + 3621286	BH48_0.05-0.2	Copper Street	Shaft SH13	Soil	SILT (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH48_3.0-3.1	Copper Street	Shaft SH13	Soil	Siltstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH48_6.5-6.7	Copper Street	Shaft SH13	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624327	BH49_0.05-0.2	Arch Hill Reserve	Shaft SH14	Soil	SILT (Fill)	<0.06	<0.06	<0.06	<0.06	<0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624327	BH49_0.3-0.4	Arch Hill Reserve	Shaft SH14	Soil	SILT (Fill)	<0.06	<0.06	<0.06	<0.06	<0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH49_2.7-2.8	Arch Hill Reserve	Shaft SH14	Soil	Silty CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH49_5.0-5.1	Arch Hill Reserve	Shaft SH14	Soil	CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3634409	BH49_5.9-6.0	Arch Hill Reserve	Shaft SH14	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3624326	BH49_B1 0.35	Arch Hill Reserve	Shaft SH14	Bulk	Fibre Board	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482 + 3651494	BH51_0.5-0.6	Arch Hill Reserve	Shaft SH15	Soil	SILT (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3655466	BH51_12.0-12.33	Arch Hill Reserve	Shaft SH15	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3651482	BH51_2.0-2.45	Arch Hill Reserve	Shaft SH15	Soil	CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3655466	BH51_5.0-5.45	Arch Hill Reserve	Shaft SH15	Soil	CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3655466	BH51_8.0-8.45	Arch Hill Reserve	Shaft SH15	Soil	SAND (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3670643	BH06_12.0-12.1	Suffolk Reserve	Shaft SH02	Soil	Siltstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3670643	BH17_1.5-1.95	52 Kingsland Ave	Shaft SH05	Soil	Silty CLAY (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3670643	BH17_7.5-7.95	52 Kingsland Ave	Shaft SH05	Soil	Siltstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3670643	BH17_13.5-13.64	52 Kingsland Ave	Shaft SH05	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3670643	BH25_16.5-16.6	Myrtle Street	Shaft SH07	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3670643 + 3670623	BH36_0.6-0.7	Ophir Street	Shaft SH09	Soil	Silty CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3670643	BH36_2.5-2.6	Ophir Street	Shaft SH09	Soil	Silty CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683703	BH36_5.45	Ophir Street	Shaft SH09	Soil	SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3682863 + 3683703	BH43_0.5-0.6	Fleet Street	Shaft SH12A	Soil	CLAY (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683703	BH43_2.3	Fleet Street	Shaft SH12A	Soil	SILT (Fill)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3674838 + 3674826	BH14_0.6-0.7	Nixon Park Carpark	Shaft SH04	Soil	CLAY (Fill)	<0.07	<0.07	<0.07	<0.13	<0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683703	BH14_2.5-2.6	Nixon Park Carpark	Shaft SH04	Soil	SILT (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683703	BH14_10.0-10.1	Nixon Park Carpark	Shaft SH04	Soil	Sandstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3674838 + 3674826	BH38_1.1-1.2	Gundry Street	Shaft SH10	Soil	SILT (Natural)	<0.06	<0.06	<0.06	<0.11	<0.06	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	-	<0.5	<1.0	-	<1.0	<0.5	<2	<0.8	<1.0	<1.0	-	<0.5	-	<0.5	<0.5	<1.0	<0.8	<0.5	<0.5	<0.4	<0.5	<10	<0.5	<0.5	<0.5	<0.5
3694107	BH38_6.9-7.0	Gundry Street	Shaft SH10	Soil	Siltstone (Natural)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

#1 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
#2 Value for hexavalent chromium
#3 No limit. Derived value exceeds 10,000 mg/kg.
#4 Value is for inorganic lead
#5 Value is for BaP TEQ. Refer NES Users' Guide for notes.
#6 The SCS value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrin if both are involved.
#7 DDT (as the sum of DDT and its metabolites DDD and DDE)
#8 Value is for total chromium
#9 Value is for benzo (a) pyrene (equivalent)
#10 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lit
#11 Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be consi
#12 Value for total xylene (o, m and p)
#13 Residual Separate Phase Hydrocarbons (RSPH)

Environmental Standards
A - Ministry for the Environment, 2012, NESCS - Commercial / Industrial
B - NEPC, 2013, NEPM (Ni,Zn only) - Commercial/ Industrial
C - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.
D - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils.
E - wasteMINZ, September 2023, Class 3 Managed Fill Waste Acceptance Criteria
F - Ministry for the Environment, August 1999, Module 4, Tier 1 Maintenance worker (SAND)
G - Ministry for the Environment, August 1999, Module 4, Tier 1 GW 2m (CLAY)/(SANDY SILT)
H - BRANZ, 2017, NZ GAMAS (Asbestos) Commercial/ industrial

Project: WIWQIP Motions Catchment Improvement
Client: Watercare
Aurecon ref: 521290-064

							Inorganics	TPH				PAH															Phenols							
							TSS	C7-C9	C15-C36	C7-C36	C10-C14	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Benzo(b+j)fluoranthene	Phenanthrene	Pyrene	3/4-Methylphenol (m/p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol
							mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Module 5, Tier 1 Groundwater Acceptance Criteria, Potable[A]								18[#1]	[#2]		[#2]																							
Module 5, Tier 1 Groundwater Acceptance Criteria, Irrigation[A]								[#2]	[#2]		[#2]														800			2,000						
ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)[B]															7[#3]		0.7[#3]					2[#3]			85[#4]		8[#3]				95[#4]	270[#5]		870[#6]		
Lab Report No.	**Field ID**	**Location**	**Characterising**	**Date**	**Matrix Type**																														
3680726	BH06_01	Suffolk Reserve	Shaft SH02	26 09 2024	Groundwater		4,200	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	-	-	-	-	-	-	-	-
3680726	BH10_01	Mostyn Street	Shaft SH03	26 09 2024	Groundwater		480	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3680726	BH44_01	Basque Park	Shaft SH12A	26 09 2024	Groundwater		-	<0.10	<0.4	<0.7	<200	<3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	<10	<10	<10	<5	<5	<5	<5	<10
3680726	BH46_02	Basque Park	Shaft SH12	26 09 2024	Groundwater		36,000	<0.10	<0.4	<0.7	<200	<3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	<10	<10	<10	<5	<5	<5	<5	<10
3680726	BH51_01	Arch Hill Reserve	Shaft SH15	26 09 2024	Groundwater		96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH17_01	52 Kingsland Ave	Shaft SH05	30 09 2024	Groundwater		30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH25_01	Myrtle Street	Shaft SH07	30 09 2024	Groundwater		36	-	-	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	-	-	-	-	-	-	-	-
3683704	BH36_01	Ophir Street	Shaft SH09	30 09 2024	Groundwater		15,100	<0.10	<0.4	<0.7	<200	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	-	-	-	-	-	-	-	-
3683704	BH38_01	Gundry Street	Shaft SH10	30 09 2024	Groundwater		2,700	<0.10	<0.4	<0.7	<200	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	-	-	-	-	-	-	-	-
3690956	BH14-01	Nixon Park Carpark	Shaft SH04	10 10 2024	Groundwater		7,100	<0.10	<0.4	<0.7	<200	<3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	<10	<10	<10	<5	<5	<5	<5	<10
3690956	BH39-01	Burgoyne Street	Shaft SH11	10 10 2024	Groundwater		123	<0.10	<0.4	<0.7	<200	<3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.2	<0.10	<0.5	<0.10	<0.4	<0.2	<10	<10	<10	<5	<5	<5	<5	<10
Statistics																																			
Minimum Concentration							**<3**	**<0.1**	**<0.4**	**<0.7**	**<200**	**<3**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.2**	**<0.1**	**<0.5**	**<0.1**	**<0.4**	**<0.2**	**<10**	**<10**	**<10**	**<5**	**<5**	**<5**	**<5**	**<10**
Maximum Concentration							**36,000**	**0.62**	**<0.4**	**1.8**	**1,100**	**23**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.2**	**<0.1**	**<0.5**	**<0.1**	**<0.4**	**<0.2**	**<10**	**<10**	**<10**	**<5**	**<5**	**<5**	**<5**	**<10**
% of Detects							**86**	**14**	**0**	**14**	**14**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
% of Non-Detects							**14**	**86**	**100**	**86**	**86**	**80**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**85**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Comments
#1 ESL
#2 >S
#3 Unknown reliability
#4 Low reliability
#5 Low reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief for spread of data and its significance.
#6 Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief for spread of data and its significance.
#7 Moderate reliability
#8 Very high reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief for spread of data and its significance.
#9 High reliability
#10 Very Low reliability
#11 Moderate reliability. DGV may not protect key test species from acute (and chronic) toxicity. Check toxicant DGV technical brief for spread of data and its significance. This DGV is greater than the value for acute toxicity (Warne et al., 2018).

Environmental Standards
A: Mfe, 1999. MfE Petroleum Guidelines. Module 5: Teir 1 groundwater acceptance criteria.
B: ANZG, July 2023, ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)

				Amino Aliphatics	Chlorinated Hydrocarbons		Metals							Explosives			Halogenated Benzenes				Organochlorine Pesticides									
				4-chloro-3-methylphenol	Pentachlorophenol	Phenol	N-nitrosodi-n-propylamine	Hexachloroethane	Hexachlorobutadiene	Arsenic (filtered)	Cadmium (filtered)	Copper (filtered)	Chromium (III+VI) (filtered)	Lead (filtered)	Nickel (filtered)	Zinc (filtered)	2,6-dinitrotoluene	2,4-Dinitrotoluene	Nitrobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexachlorobenzene	4,4-DDE	a-BHC	Aldrin	b-BHC	d-BHC	DDD	DDT	Dieldrin	Endosulfan I
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Module 5, Tier 1 Groundwater Acceptance Criteria, Potable[A]																															
Module 5, Tier 1 Groundwater Acceptance Criteria, Irrigation[A]																															
ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)[B]					27[#7]	1,200[#7]		500[#7]			0.8[#8]	2.5[#8]		9.4[#6]	17[#4]	31[#9]		250[#6]	1,300[#4]	300[#5]	270[#7]	520[#6]	100[#10]	0.3[#3]						0.04[#7]		
Lab Report No.	Field ID	Location	Characterising	Date	Matrix Type																											
3680726	BH06_01	Suffolk Reserve	Shaft SH02	26 09 2024	Groundwater	-	-	-	-	-	-	<1.0	0.17	2.6	<0.5	0.17	34	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3680726	BH10_01	Mostyn Street	Shaft SH03	26 09 2024	Groundwater	-	-	-	-	-	-	<1.0	<0.05	<0.5	<0.5	<0.10	1.3	11.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3680726	BH44_01	Basque Park	Shaft SH12A	26 09 2024	Groundwater	<10	<100	<10	<10	<10	<10	1.9	<0.05	1.0	<0.5	<0.10	3.4	2.4	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<10	<5	<10
3680726	BH46_02	Basque Park	Shaft SH12	26 09 2024	Groundwater	<10	<100	<10	<10	<10	<10	<1.0	<0.05	1.2	<0.5	<0.10	2.7	11.7	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<10	<5	<10
3680726	BH51_01	Arch Hill Reserve	Shaft SH15	26 09 2024	Groundwater	-	-	-	-	-	-	<1.0	<0.05	1.3	<0.5	<0.10	5.4	4.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH17_01	52 Kingsland Ave	Shaft SH05	30 09 2024	Groundwater	-	-	-	-	-	-	<1.0	<0.05	0.5	<0.5	<0.10	<0.5	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH25_01	Myrtle Street	Shaft SH07	30 09 2024	Groundwater	-	-	-	-	-	-	<1.0	<0.05	0.6	<0.5	<0.10	1.7	9.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH36_01	Ophir Street	Shaft SH09	30 09 2024	Groundwater	-	-	-	-	-	-	<1.0	<0.05	<0.5	<0.5	<0.10	5.5	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH38_01	Gundry Street	Shaft SH10	30 09 2024	Groundwater	-	-	-	-	-	-	<1.0	<0.05	2.4	<0.5	<0.10	9.6	13.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3690956	BH14-01	Nixon Park Carpark	Shaft SH04	10 10 2024	Groundwater	<10	<100	<10	<10	<10	<10	<1.0	<0.05	2.1	<0.5	<0.10	0.7	3.4	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<10	<5	<10
3690956	BH39-01	Burgoyne Street	Shaft SH11	10 10 2024	Groundwater	<10	<100	<10	<10	<10	<10	<1.0	<0.05	0.8	<0.5	<0.10	4.5	9.7	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<10	<5	<10
Statistics																																
Minimum Concentration				<10	<100	<10	<10	<10	<10	<1	<0.05	0.5	<0.5	<0.1	<0.5	<1	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<5	<10	<5	<10
Maximum Concentration				<10	<100	<10	<10	<10	<10	1.9	0.17	2.6	0.6	0.17	34	62	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<5	<10	<5	<10
% of Detects				0	0	0	0	0	0	7	7	73	7	7	80	87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Non-Detects				100	100	100	100	100	100	93	93	27	93	93	20	13	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Comments

#1 ESL
#2 >S
#3 Unknown reliability
#4 Low reliability
#5 Low reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic value
#6 Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic
#7 Moderate reliability
#8 Very high reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic
#9 High reliability
#10 Very Low reliability
#11 Moderate reliability. DGV may not protect key test species from acute (and chronic) toxicity. Check toxicant DGV

Environmental Standards
A: Mfe, 1999. MfE Petroleum Guidelines. Module 5: Teir 1 groundwater acceptance criteria.
B: ANZG, July 2023, ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)

									Phthalates							SVOCs											
									Endosulfan II	Endosulfan sulphate	Endrin	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Dimethyl phthalate	Di-n-octyl phthalate	Diethylphthalate	Di-n-butyl phthalate	1&2-Chloronaphthalene	Di(2-ethylhexyl)adipate	N-Nitrosodiphenylamine + Diphenylamine	Carbazole	Isophorone	4-bromophenyl phenyl ether	4-chlorophenyl phenyl ether	Benzyl alcohol	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	Dibenzofuran
									µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	g/m3	µg/L	g/m3	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Module 5, Tier 1 Groundwater Acceptance Criteria, Potable[A]																																
Module 5, Tier 1 Groundwater Acceptance Criteria, Irrigation[A]																																
ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)[B]											0.06[#11]		1[#11]	0.7[#11]				5,100[#4]		1,300[#4]	65[#4]											
Lab Report No.	**Field ID**	**Location**	**Characterising**	**Date**	**Matrix Type**																											
3680726	BH06_01	Suffolk Reserve	Shaft SH02	26 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3680726	BH10_01	Mostyn Street	Shaft SH03	26 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3680726	BH44_01	Basque Park	Shaft SH12A	26 09 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5
3680726	BH46_02	Basque Park	Shaft SH12	26 09 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5
3680726	BH51_01	Arch Hill Reserve	Shaft SH15	26 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH17_01	52 Kingsland Ave	Shaft SH05	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH25_01	Myrtle Street	Shaft SH07	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH36_01	Ophir Street	Shaft SH09	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH38_01	Gundry Street	Shaft SH10	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3690956	BH14-01	Nixon Park Carpark	Shaft SH04	10 10 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5
3690956	BH39-01	Burgoyne Street	Shaft SH11	10 10 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5
Statistics																																
Minimum Concentration						**<10**	**<10**	**<10**	**<10**	**<5**	**<5**	**<5**	**<30**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<0.003**	**<5**	**<0.01**	**<5**	**<5**	**<5**	**<5**	**<5**	**<50**	**<5**	**<5**	**<5**	**<5**
Maximum Concentration						**<10**	**<10**	**<10**	**<10**	**<5**	**<5**	**<5**	**<30**	**<10**	**<10**	**<10**	**<10**	**<10**	**<10**	**<0.003**	**<5**	**<0.01**	**<5**	**<5**	**<5**	**<5**	**<5**	**<50**	**<5**	**<5**	**<5**	**<5**
% of Detects						**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
% of Non-Detects						**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Comments
#1 ESL
#2 >S
#3 Unknown reliability
#4 Low reliability
#5 Low reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic value
#6 Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic
#7 Moderate reliability
#8 Very high reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic
#9 High reliability
#10 Very Low reliability
#11 Moderate reliability. DGV may not protect key test species from acute (and chronic) toxicity. Check toxicant DGV

Environmental Standards
A: Mfe, 1999. MfE Petroleum Guidelines. Module 5: Teir 1 groundwater acceptance criteria.
B: ANZG, July 2023, ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)

Project: WIWQIP Motions Catchment Improvement
Client: Watercare
Aurecon ref: 521290 - 064

							Metals TCLP						
							Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Nickel	Zinc
							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
						Class 1 Landfill Waste Acceptance Criteria	5	1	5	5	5	10	10
						Class 2 C + D Landfill Waste Acceptance Criteria	1	0.2	1	0.5	1	1	1
Lab Report No.	Field ID + Depth (m)	Location	Characterising	Matrix Type	Matrix Description	Sample date							
3620390	BH48_0.05-0.2 [TCLP Extract]	Copper Street	Shaft SH13	Soil	SILT (Fill)	06 07 2024	-	-	-	-	0.55	-	-
Statistics													
Minimum Concentration							4	<0.1	12	10	0.55	<2	10
Maximum Concentration							70	0.44	43	52	0.55	80	310
% of Detects							100	67	100	100	100	83	100
% of Non-Detects							0	33	0	0	0	17	0

Environmental Standards
wasteMINZ, September 2023, Class 1 and 2 Waste Acceptance Criteria

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Parnell
Auckland 1052 New Zealand

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+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3658961	A2Pv1
Contact:	Tiana Hill C/- Aurecon New Zealand Limited PO Box 9762 Newmarket Auckland 1149	**Date Received:**	28-Aug-2024	
		Date Reported:	30-Aug-2024	
		Quote No:	126272	
		Order No:		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled 26/08/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH25_0.2-0.3
Lab Number:		3658961.1
Asbestos Presence / Absence		Asbestos NOT detected.
Description of Asbestos Form		-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001
As Received Weight	g	629.9
Dry Weight	g	456.6
Moisture*	%	28
Sample Fraction >10mm*	g dry wt	70.8
Sample Fraction <10mm to >2mm*	g dry wt	206.5
Sample Fraction <2mm*	g dry wt	178.7
<2mm Subsample Weight*	g dry wt	52.8
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 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.

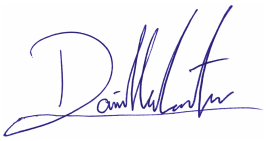
Sample Type: Soil

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; 28 Heather Street, Auckland.	0.1 g	1
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
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; 28 Heather Street, Auckland.	0.1 g dry wt	1
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
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

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

Testing was completed on 30-Aug-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3663691	A2Pv1
Contact:	Tiana Hill	**Date Received:**	03-Sep-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	05-Sep-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Add. Client Ref:	Sampled: 29/08/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH06_0.4-0.5
Lab Number:		3663691.1
Asbestos Presence / Absence		Asbestos NOT detected.
Description of Asbestos Form		-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001
As Received Weight	g	721.7
Dry Weight	g	559.6
Moisture*	%	22
Sample Fraction >10mm*	g dry wt	191.2
Sample Fraction <10mm to >2mm*	g dry wt	282.4
Sample Fraction <2mm*	g dry wt	83.9
<2mm Subsample Weight*	g dry wt	50.1
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 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; 28 Heather Street, Auckland.	0.1 g	1
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
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; 28 Heather Street, Auckland.	0.1 g dry wt	1
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
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

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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3670623	A2Pv1
Contact:	Tiana Hill	**Date Received:**	12-Sep-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	16-Sep-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

		Sample Name:	BH36_0.6-0.7 12-Sep-2024	BH46_3.5-3.6 23-Aug-2024
		Lab Number:	3670623.1	3670623.2
Asbestos Presence / Absence			Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form			-	-
Asbestos in ACM as % of Total Sample*	% w/w		< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w		< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w		< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w		< 0.001	< 0.001
As Received Weight	g		827.9	968.0
Dry Weight	g		544.3	742.7
Moisture*	%		34	23
Sample Fraction >10mm*	g dry wt		306.2	464.9
Sample Fraction <10mm to >2mm*	g dry wt		185.7	210.4
Sample Fraction <2mm*	g dry wt		50.6	67.2
<2mm Subsample Weight*	g dry wt		50.6	53.0
Weight of Asbestos in ACM (Non-Friable)	g dry wt		< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt		< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt		< 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.

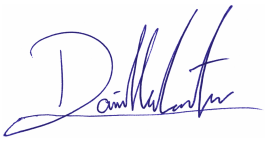
Sample Type: Soil

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; 28 Heather Street, Auckland.	0.1 g	1-2
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-2
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-2
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
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; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-2
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-2
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
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

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

Testing was completed on 16-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3626399	A2Pv1
Contact:	Tiana Hill	**Date Received:**	12-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	16-Jul-2024	
	PO Box 2292	**Quote No:**	126272	
	Tauranga 3140	**Order No:**		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 10/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH13_0.4-0.5
Lab Number:		3626399.2
Asbestos Presence / Absence		Asbestos NOT detected.
Description of Asbestos Form		-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001
As Received Weight	g	686.2
Dry Weight	g	524.2
Moisture*	%	24
Sample Fraction >10mm*	g dry wt	76.1
Sample Fraction <10mm to >2mm*	g dry wt	314.1
Sample Fraction <2mm*	g dry wt	133.6
<2mm Subsample Weight*	g dry wt	53.1
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 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.
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• 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; 28 Heather Street, Auckland.	0.1 g	2
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	2
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	2
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	2
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; 28 Heather Street, Auckland.	0.1 g dry wt	2
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	2
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	2
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	2
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	2
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	2
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	2
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	2
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	2
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	2
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	2

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

Testing was completed on 16-Jul-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.

Alexa Badenhorst BSc (Hons)
Team Leader - Asbestos

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3624327	A2Pv1
Contact:	Tiana Hill	**Date Received:**	10-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	12-Jul-2024	
	PO Box 2292	**Quote No:**	126272	
	Tauranga 3140	**Order No:**		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 8/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH49_0.05-0.2	BH49_0.3-0.4
Lab Number:		3624327.1	3624327.2
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001
As Received Weight	g	721.0	818.1
Dry Weight	g	501.6	642.7
Moisture*	%	30	21
Sample Fraction >10mm*	g dry wt	66.4	195.1
Sample Fraction <10mm to >2mm*	g dry wt	357.6	372.9
Sample Fraction <2mm*	g dry wt	77.3	74.1
<2mm Subsample Weight*	g dry wt	54.1	52.1
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 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.

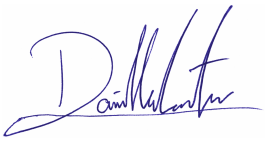
Sample Type: Soil

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; 28 Heather Street, Auckland.	0.1 g	1-2
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-2
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-2
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
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; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-2
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-2
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
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

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

Testing was completed on 12-Jul-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3682863	A2Pv1
Contact:	Tiana Hill	**Date Received:**	30-Sep-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	03-Oct-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Add. Client Ref:	Sampled 24/09/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

	Sample Name:		BH43_0.5-0.6
	Lab Number:		3682863.1
Asbestos Presence / Absence			Asbestos NOT detected.
Description of Asbestos Form			-
Asbestos in ACM as % of Total Sample*		% w/w	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*		% w/w	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*		% w/w	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*		% w/w	< 0.001
As Received Weight		g	738.9
Dry Weight		g	550.9
Moisture*		%	25
Sample Fraction >10mm*		g dry wt	198.1
Sample Fraction <10mm to >2mm*		g dry wt	271.6
Sample Fraction <2mm*		g dry wt	79.6
<2mm Subsample Weight*		g dry wt	51.5
Weight of Asbestos in ACM (Non-Friable)		g dry wt	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*		g dry wt	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*		g dry wt	< 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.
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• 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; 28 Heather Street, Auckland.	0.1 g	1
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
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; 28 Heather Street, Auckland.	0.1 g dry wt	1
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
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

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

Testing was completed between 02-Oct-2024 and 03-Oct-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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Team Leader - Asbestos

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3624326	A2Pv1
Contact:	Tiana Hill	**Date Received:**	10-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	12-Jul-2024	
	PO Box 2292	**Quote No:**	126272	
	Tauranga 3140	**Order No:**		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 8/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Building Material

Sample Name	Lab Number	Sample Category	Sample Weight on receipt (g)	Asbestos Presence / Absence	Description of Asbestos in Non Homogeneous Samples
BH49_B1 0.35m / BH49	3624326.1	Fibre Board	10.61	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	N/A

Glossary of Terms

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• 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.

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: Building Material

Test	Method Description	Default Detection Limit	Sample No
Asbestos in Bulk Material			
Sample Category	Assessment of sample type. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	-	1
Sample Weight on receipt	Sample weight (approximate). Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.01 g	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos in Non Homogeneous Samples	Form, dimensions and/or weight of asbestos fibres present. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1

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

Testing was completed between 11-Jul-2024 and 12-Jul-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.

Alexa Badenhorst BSc (Hons)
Team Leader - Asbestos

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3674826	A2Pv1
Contact:	Tiana Hill	**Date Received:**	18-Sep-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	19-Sep-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-64	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH38_1.1-1.2 18-Sep-2024	BH14_0.6-0.7 16-Sep-2024
Lab Number:		3674826.1	3674826.2
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001
As Received Weight	g	1,064.8	883.9
Dry Weight	g	830.6	645.7
Moisture*	%	22	27
Sample Fraction >10mm*	g dry wt	53.1	311.5
Sample Fraction <10mm to >2mm*	g dry wt	546.0	241.3
Sample Fraction <2mm*	g dry wt	223.0	86.0
<2mm Subsample Weight*	g dry wt	46.5	55.6
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001

Glossary of Terms

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• 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.

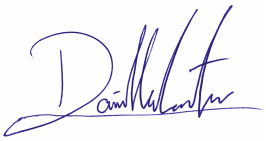
Sample Type: Soil

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; 28 Heather Street, Auckland.	0.1 g	1-2
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-2
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-2
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
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; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-2
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-2
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
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

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

Testing was completed on 19-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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www.hill-labs.co.nz

Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3651494	A2Pv1
Contact:	Tiana Hill C/- Aurecon New Zealand Limited PO Box 9762 Newmarket Auckland 1149	**Date Received:** **Date Reported:** **Quote No:** **Order No:** **Client Reference:** **Add. Client Ref:** **Submitted By:**	16-Aug-2024 19-Aug-2024 126272 521290-064 Sampled: 14-15/08/24 Tiana Hill	

Sample Type: Soil

		Sample Name:	BH44_0.3-0.4	BH44_1.1-1.2	BH44_3.0-3.4	BH51_0.5-0.6
		Lab Number:	3651494.1	3651494.2	3651494.3	3651494.4
Asbestos Presence / Absence			Asbestos NOT detected.	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	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w		< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w		< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w		< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g		541.7	841.7	746.1	794.3
Dry Weight	g		429.7	557.1	589.5	642.2
Moisture*	%		21	34	21	19
Sample Fraction >10mm*	g dry wt		38.4	234.5	317.5	163.8
Sample Fraction <10mm to >2mm*	g dry wt		311.2	261.9	194.1	367.4
Sample Fraction <2mm*	g dry wt		79.4	58.9	76.0	109.8
<2mm Subsample Weight*	g dry wt		52.4	58.9	50.5	55.8
Weight of Asbestos in ACM (Non-Friable)	g dry wt		< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt		< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt		< 0.00001	< 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.
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- 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.
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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

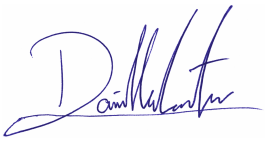
The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix 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; 28 Heather Street, Auckland.	0.1 g	1-4
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-4
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-4
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-4
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; 28 Heather Street, Auckland.	0.1 g dry wt	1-4
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-4
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-4
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-4
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-4
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	1-4
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-4
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	1-4
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-4
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	1-4
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	1-4

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

Testing was completed on 19-Aug-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.



Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

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Parnell
Auckland 1052 New Zealand

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www.hill-labs.co.nz

Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3655467	A2Pv1
Contact:	Andrew Allcock	**Date Received:**	22-Aug-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	23-Aug-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290 - 064	
		Add. Client Ref:	Sampled: 19/08/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH46_0.4-0.5	BH46_1.4-1.6	BH45_0.8-1.0
Lab Number:		3655467.1	3655467.2	3655467.3
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	713.0	686.9	787.4
Dry Weight	g	563.1	541.3	605.0
Moisture*	%	21	21	23
Sample Fraction >10mm*	g dry wt	270.6	242.2	260.4
Sample Fraction <10mm to >2mm*	g dry wt	233.2	232.0	271.0
Sample Fraction <2mm*	g dry wt	58.9	64.2	72.2
<2mm Subsample Weight*	g dry wt	58.9	51.9	55.8
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.

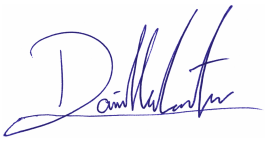
Sample Type: Soil

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; 28 Heather Street, Auckland.	0.1 g	1-3
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-3
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-3
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
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; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-3
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-3
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
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	1-3
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
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	1-3
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
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	1-3
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	1-3

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

Testing was completed on 23-Aug-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.



Danielle Carter BSc, PGDipSci, MSc
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www.hill-labs.co.nz

Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3621286	A2Pv1
Contact:	Tiana Hill	**Date Received:**	05-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	11-Jul-2024	
	PO Box 2292	**Quote No:**	126272	
	Tauranga 3140	**Order No:**		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 04/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH29_0.05-0.2	BH48_0.05-0.2	BH10_0.4-0.5	BH10_1.0-1.1
Lab Number:		3621286.1	3621286.2	3621286.4	3621286.5
Asbestos Presence / Absence		Asbestos NOT detected.	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	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	723.2	804.6	624.3	1,025.4
Dry Weight	g	540.1	626.6	503.2	714.1
Moisture*	%	25	22	19	30
Sample Fraction >10mm*	g dry wt	55.6	94.9	48.1	122.7
Sample Fraction <10mm to >2mm*	g dry wt	313.6	399.6	352.9	408.5
Sample Fraction <2mm*	g dry wt	170.6	131.6	101.8	182.2
<2mm Subsample Weight*	g dry wt	51.5	54.7	53.7	52.9
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Glossary of Terms

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- 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.
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- 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; 28 Heather Street, Auckland.	0.1 g	1-2, 4-5
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-2, 4-5
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-2, 4-5
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2, 4-5
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; 28 Heather Street, Auckland.	0.1 g dry wt	1-2, 4-5
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2, 4-5
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-2, 4-5
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-2, 4-5
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 4-5
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, 4-5
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 4-5
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, 4-5
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 4-5
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, 4-5
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, 4-5

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

Testing was completed on 11-Jul-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.

Mahaleel (May) Alfante BSc, PGDipSci
Laboratory Technician - Asbestos

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www.hill-labs.co.nz

Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3629428	A2Pv1
Contact:	Tiana Hill	**Date Received:**	17-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	19-Jul-2024	
	PO Box 2292	**Quote No:**	126272	
	Tauranga 3140	**Order No:**		
		Client Reference:	521290 - 064	
		Add. Client Ref:	Sampled: 16/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH39_0.5-0.6
Lab Number:		3629428.1
Asbestos Presence / Absence		Asbestos NOT detected.
Description of Asbestos Form		-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001
As Received Weight	g	691.0
Dry Weight	g	530.2
Moisture*	%	23
Sample Fraction >10mm*	g dry wt	133.7
Sample Fraction <10mm to >2mm*	g dry wt	306.7
Sample Fraction <2mm*	g dry wt	88.3
<2mm Subsample Weight*	g dry wt	50.5
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001

Glossary of Terms

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• 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.
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• 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.

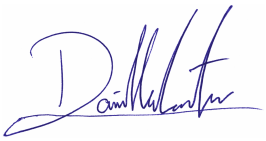
Sample Type: Soil

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; 28 Heather Street, Auckland.	0.1 g	1
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
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; 28 Heather Street, Auckland.	0.1 g dry wt	1
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
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
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

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

Testing was completed on 19-Jul-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.



Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3583099	A2Pv1
Contact:	Tiana Hill	**Date Received:**	16-May-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	20-May-2024	
	PO Box 2292	**Quote No:**	126272	
	Tauranga 3140	**Order No:**		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 13/05/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH30_0.23m	BH30_0.62m
Lab Number:		3583099.1	3583099.2
Asbestos Presence / Absence		Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form		-	-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001
As Received Weight	g	612.9	814.1
Dry Weight	g	504.4	559.4
Moisture*	%	18	31
Sample Fraction >10mm*	g dry wt	176.3	< 0.1
Sample Fraction <10mm to >2mm*	g dry wt	257.9	460.0
Sample Fraction <2mm*	g dry wt	69.7	98.3
<2mm Subsample Weight*	g dry wt	69.7	49.3
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 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.

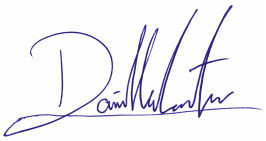
Sample Type: Soil

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; 28 Heather Street, Auckland.	0.1 g	1-2
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-2
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-2
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
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; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-2
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-2
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; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
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
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

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

Testing was completed on 20-May-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3694107 SPv1
Contact:	Hannah Sussex	**Date Received:**	15-Oct-2024
	C/- Aurecon New Zealand Limited	**Date Reported:**	18-Oct-2024
	PO Box 9762	**Quote No:**	126272
	Newmarket	**Order No:**	
	Auckland 1149	**Client Reference:**	
		Submitted By:	Hannah Sussex

Sample Type: Soil

Sample Name:		BH38_6.9-7.0 15-Oct-2024
Lab Number:		3694107.1
Heavy Metals, Screen Level		
Total Recoverable Arsenic	mg/kg dry wt	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10
Total Recoverable Chromium	mg/kg dry wt	18
Total Recoverable Copper	mg/kg dry wt	27
Total Recoverable Lead	mg/kg dry wt	8.1
Total Recoverable Nickel	mg/kg dry wt	18
Total Recoverable Zinc	mg/kg dry wt	64

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
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
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

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

Testing was completed between 16-Oct-2024 and 18-Oct-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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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3582989 SPv1
Contact:	Tiana Hill	**Date Received:**	16-May-2024
	C/- Aurecon New Zealand Limited	**Date Reported:**	20-May-2024
	PO Box 2292	**Quote No:**	126272
	Tauranga 3140	**Order No:**	
		Client Reference:	521290-064
		Submitted By:	Tiana Hill

Sample Type: Soil

		Sample Name:	BH30_0.23m 13-May-2024	BH30_0.62m 13-May-2024
		Lab Number:	3582989.1	3582989.2
Individual Tests				
Dry Matter	g/100g as rcvd		74	69
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt		12	< 2
Total Recoverable Cadmium	mg/kg dry wt		0.12	< 0.10
Total Recoverable Chromium	mg/kg dry wt		26	22
Total Recoverable Copper	mg/kg dry wt		20	5
Total Recoverable Lead	mg/kg dry wt		31	8.1
Total Recoverable Nickel	mg/kg dry wt		23	9
Total Recoverable Zinc	mg/kg dry wt		53	20
Organochlorine Pesticides Screening in Soil				
Aldrin	mg/kg dry wt		< 0.014	-
alpha-BHC	mg/kg dry wt		< 0.014	-
beta-BHC	mg/kg dry wt		< 0.014	-
delta-BHC	mg/kg dry wt		< 0.014	-
gamma-BHC (Lindane)	mg/kg dry wt		< 0.014	-
cis-Chlordane	mg/kg dry wt		< 0.014	-
trans-Chlordane	mg/kg dry wt		< 0.014	-
2,4'-DDD	mg/kg dry wt		< 0.014	-
4,4'-DDD	mg/kg dry wt		< 0.014	-
2,4'-DDE	mg/kg dry wt		< 0.014	-
4,4'-DDE	mg/kg dry wt		< 0.014	-
2,4'-DDT	mg/kg dry wt		< 0.014	-
4,4'-DDT	mg/kg dry wt		< 0.014	-
Total DDT Isomers	mg/kg dry wt		< 0.09	-
Dieldrin	mg/kg dry wt		< 0.014	-
Endosulfan I	mg/kg dry wt		< 0.014	-
Endosulfan II	mg/kg dry wt		< 0.014	-
Endosulfan sulphate	mg/kg dry wt		< 0.014	-
Endrin	mg/kg dry wt		< 0.014	-
Endrin aldehyde	mg/kg dry wt		< 0.014	-
Endrin ketone	mg/kg dry wt		< 0.014	-
Heptachlor	mg/kg dry wt		< 0.014	-
Heptachlor epoxide	mg/kg dry wt		< 0.014	-
Hexachlorobenzene	mg/kg dry wt		< 0.014	-
Methoxychlor	mg/kg dry wt		< 0.014	-

Sample Type: Soil			
Sample Name:		BH30_0.23m 13-May-2024	BH30_0.62m 13-May-2024
Lab Number:		3582989.1	3582989.2
Polycyclic Aromatic Hydrocarbons Screening in Soil*			
Total of Reported PAHs in Soil	mg/kg dry wt	1.6	< 0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.015
2-Methylnaphthalene	mg/kg dry wt	< 0.03	< 0.03
Acenaphthylene	mg/kg dry wt	< 0.014	< 0.015
Acenaphthene	mg/kg dry wt	< 0.014	< 0.015
Anthracene	mg/kg dry wt	< 0.014	< 0.015
Benzo[a]anthracene	mg/kg dry wt	0.110	< 0.015
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.26	< 0.015
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.35	< 0.035
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.35	< 0.035
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	0.23	< 0.015
Benzo[e]pyrene	mg/kg dry wt	0.135	< 0.015
Benzo[g,h,i]perylene	mg/kg dry wt	0.164	< 0.015
Benzo[k]fluoranthene	mg/kg dry wt	0.091	< 0.015
Chrysene	mg/kg dry wt	0.102	< 0.015
Dibenzo[a,h]anthracene	mg/kg dry wt	0.030	< 0.015
Fluoranthene	mg/kg dry wt	0.111	< 0.015
Fluorene	mg/kg dry wt	< 0.014	< 0.015
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.155	< 0.015
Naphthalene	mg/kg dry wt	< 0.07	< 0.08
Perylene	mg/kg dry wt	0.063	< 0.015
Phenanthrene	mg/kg dry wt	0.020	< 0.015
Pyrene	mg/kg dry wt	0.170	< 0.015

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**
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
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
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
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	1
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1-2
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
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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	1-2

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

Testing was completed between 17-May-2024 and 20-May-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3590857 SPv1
Contact:	Tiana Hill	**Date Received:**	24-May-2024
	C/- Aurecon New Zealand Limited	**Date Reported:**	28-May-2024
	PO Box 2292	**Quote No:**	126272
	Tauranga 3140	**Order No:**	
		Client Reference:	521290-064
		Submitted By:	Andrew Allcock

Sample Type: Soil

		Sample Name:	BH22_0.2-0.3m 22-May-2024	BH22_0.6m 22-May-2024
		Lab Number:	3590857.1	3590857.2
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt		6	7
Total Recoverable Cadmium	mg/kg dry wt		0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt		28	9
Total Recoverable Copper	mg/kg dry wt		23	3
Total Recoverable Lead	mg/kg dry wt		199	11.6
Total Recoverable Nickel	mg/kg dry wt		55	6
Total Recoverable Zinc	mg/kg dry wt		74	6

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
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
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

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

Testing was completed between 25-May-2024 and 28-May-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3620390	SPv2
Contact:	Tiana Hill	**Date Received:**	04-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	14-Aug-2024	**(Amended)**
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Submitted By:	Andrew Allcock	

Sample Type: Soil

Sample Name:		BH29_0.05-0.2 04-Jul-2024	BH48_0.05-0.2 04-Jul-2024	BH10_0.4-0.5 04-Jul-2024	BH10_1.0-1.1 04-Jul-2024
Lab Number:		3620390.1	3620390.2	3620390.4	3620390.5
Individual Tests					
Dry Matter	g/100g as rcvd	-	-	79	70
TCLP Weight of Sample Taken	g	-	50	-	-
TCLP Initial Sample pH	pH Units	-	7.8	-	-
TCLP Acid Adjusted Sample pH	pH Units	-	1.6	-	-
TCLP Extractant Type*		-	NaOH/Acetic acid at pH 4.93 +/- 0.05	-	-
TCLP Extraction Fluid pH	pH Units	-	5.0	-	-
TCLP Post Extraction Sample pH	pH Units	-	5.0	-	-
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	12	6	5	7
Total Recoverable Cadmium	mg/kg dry wt	0.32	0.44	0.15	0.11
Total Recoverable Chromium	mg/kg dry wt	43	19	23	21
Total Recoverable Copper	mg/kg dry wt	52	35	31	14
Total Recoverable Lead	mg/kg dry wt	69	900	56	42
Total Recoverable Nickel	mg/kg dry wt	80	18	26	12
Total Recoverable Zinc	mg/kg dry wt	132	310	90	98
BTEX in Soil by Headspace GC-MS					
Benzene	mg/kg dry wt	-	-	< 0.06	< 0.07
Toluene	mg/kg dry wt	-	-	< 0.06	< 0.07
Ethylbenzene	mg/kg dry wt	-	-	< 0.06	< 0.07
m&p-Xylene	mg/kg dry wt	-	-	< 0.11	< 0.13
o-Xylene	mg/kg dry wt	-	-	< 0.06	< 0.07
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	2.7	2.7
1-Methylnaphthalene	mg/kg dry wt	-	-	< 0.013	< 0.014
2-Methylnaphthalene	mg/kg dry wt	-	-	< 0.013	< 0.014
Acenaphthylene	mg/kg dry wt	-	-	0.028	0.017
Acenaphthene	mg/kg dry wt	-	-	< 0.013	< 0.014
Anthracene	mg/kg dry wt	-	-	0.045	0.031
Benzo[a]anthracene	mg/kg dry wt	-	-	0.167	0.181
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	0.25	0.25
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	0.35	0.37
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	0.35	0.36
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	0.25	0.28
Benzo[e]pyrene	mg/kg dry wt	-	-	0.149	0.146
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	0.179	0.175

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

Sample Type: Soil					
Sample Name:		BH29_0.05-0.2 04-Jul-2024	BH48_0.05-0.2 04-Jul-2024	BH10_0.4-0.5 04-Jul-2024	BH10_1.0-1.1 04-Jul-2024
Lab Number:		3620390.1	3620390.2	3620390.4	3620390.5
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Benzo[k]fluoranthene	mg/kg dry wt	-	-	0.100	0.108
Chrysene	mg/kg dry wt	-	-	0.169	0.179
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	0.032	0.032
Fluoranthene	mg/kg dry wt	-	-	0.40	0.45
Fluorene	mg/kg dry wt	-	-	0.013	< 0.014
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	0.169	0.169
Naphthalene	mg/kg dry wt	-	-	< 0.07	< 0.07
Perylene	mg/kg dry wt	-	-	0.062	0.062
Phenanthrene	mg/kg dry wt	-	-	0.160	0.176
Pyrene	mg/kg dry wt	-	-	0.48	0.44
Total Petroleum Hydrocarbons in Soil					
C7 - C9	mg/kg dry wt	-	-	< 20	< 20
C10 - C14	mg/kg dry wt	-	-	< 20	< 20
C15 - C36	mg/kg dry wt	-	-	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	< 80	< 80

Sample Type: Aqueous		
Sample Name:		BH48_0.05-0.2 [TCLP Extract]
Lab Number:		3620390.7
Individual Tests		
Total Lead	g/m^3	0.55

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3620390-SPv1' issued on 10-Jul-2024 at 4:53 pm.
Reason for amendment: TCLP lead added to one sample.

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, 4-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	4-5
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	4-5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	4-5
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	4-5
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, 4-5

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	4-5
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	4-5
TCLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1311.	-	2
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	4-5
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	4-5
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	4-5
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	4-5
TCLP Profile			
TCLP Weight of Sample Taken	Gravimetric. US EPA 1311.	0.1 g	2
TCLP Initial Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Acid Adjusted Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Extractant Type*	US EPA 1311.	-	2
TCLP Extraction Fluid pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Post Extraction Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	7
Total Lead	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.0021 g/m^3	7

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

Testing was completed between 08-Jul-2024 and 14-Aug-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

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

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www.hill-labs.co.nz

Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3624078	SPv1
Contact:	Tiana Hill	**Date Received:**	10-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	15-Jul-2024	
	PO Box 2292	**Quote No:**	126272	
	Tauranga 3140	**Order No:**		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

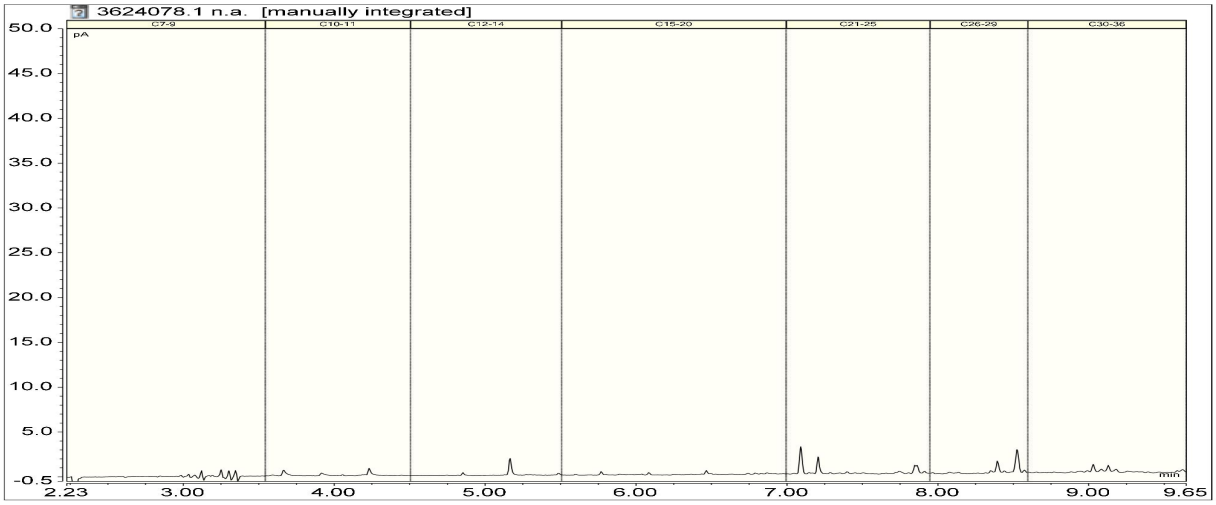
Sample Type: Soil

Sample Name:		BH49_0.05-0.2 08-Jul-2024	BH49_0.3-0.4 08-Jul-2024	BH10_1.8-1.9 05-Jul-2024	BH10_3.3-3.4 05-Jul-2024	BH10_5.9-6.0 05-Jul-2024
Lab Number:		3624078.1	3624078.2	3624078.5	3624078.6	3624078.7
Individual Tests						
Dry Matter	g/100g as rcvd	72	80	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	9	5	3	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	0.18	0.14	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	24	18	18	11	24
Total Recoverable Copper	mg/kg dry wt	40	28	14	11	16
Total Recoverable Lead	mg/kg dry wt	99	98	34	28	9.2
Total Recoverable Nickel	mg/kg dry wt	50	23	15	9	14
Total Recoverable Zinc	mg/kg dry wt	120	112	58	56	30
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.06	< 0.06	-	-	-
Toluene	mg/kg dry wt	< 0.06	< 0.06	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.06	< 0.06	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.12	< 0.11	-	-	-
o-Xylene	mg/kg dry wt	< 0.06	< 0.06	-	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	16.8	4.9	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.013	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.019	-	-	-
Acenaphthylene	mg/kg dry wt	0.142	0.028	-	-	-
Acenaphthene	mg/kg dry wt	0.020	0.014	-	-	-
Anthracene	mg/kg dry wt	0.21	0.067	-	-	-
Benzo[a]anthracene	mg/kg dry wt	1.18	0.34	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	1.69	0.43	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	2.4	0.63	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	2.4	0.62	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	1.78	0.45	-	-	-
Benzo[e]pyrene	mg/kg dry wt	1.02	0.25	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	1.22	0.33	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	0.70	0.171	-	-	-
Chrysene	mg/kg dry wt	1.11	0.39	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.22	0.057	-	-	-
Fluoranthene	mg/kg dry wt	2.3	0.78	-	-	-
Fluorene	mg/kg dry wt	0.031	0.013	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	1.19	0.28	-	-	-

Sample Type: Soil						
Sample Name:		BH49_0.05-0.2 08-Jul-2024	BH49_0.3-0.4 08-Jul-2024	BH10_1.8-1.9 05-Jul-2024	BH10_3.3-3.4 05-Jul-2024	BH10_5.9-6.0 05-Jul-2024
Lab Number:		3624078.1	3624078.2	3624078.5	3624078.6	3624078.7
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	-	-	-
Perylene	mg/kg dry wt	0.43	0.101	-	-	-
Phenanthrene	mg/kg dry wt	0.69	0.28	-	-	-
Pyrene	mg/kg dry wt	2.7	0.85	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	< 20	-	-	-
C10 - C14	mg/kg dry wt	< 20	< 20	-	-	-
C15 - C36	mg/kg dry wt	110	< 40	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	142	< 80	-	-	-

Sample Name:		BH10_9.4-9.5 05-Jul-2024
Lab Number:		3624078.8
Heavy Metals, Screen Level		
Total Recoverable Arsenic	mg/kg dry wt	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10
Total Recoverable Chromium	mg/kg dry wt	20
Total Recoverable Copper	mg/kg dry wt	15
Total Recoverable Lead	mg/kg dry wt	7.2
Total Recoverable Nickel	mg/kg dry wt	20
Total Recoverable Zinc	mg/kg dry wt	50

3624078.1
BH49_0.05-0.2 08-Jul-2024
Client Chromatogram for TPH by FID



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, 5-8
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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
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
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
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
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, 5-8
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	1-2
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1-2
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	1
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-2
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
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
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

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

Testing was completed between 11-Jul-2024 and 15-Jul-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.

Martin Cowell - BSc
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3625593 SPv1
Contact:	Tiana Hill	**Date Received:**	11-Jul-2024
	C/- Aurecon New Zealand Limited	**Date Reported:**	17-Jul-2024
	PO Box 2292	**Quote No:**	126272
	Tauranga 3140	**Order No:**	
		Client Reference:	521290-064
		Submitted By:	Andrew Allcock

Sample Type: Soil

		Sample Name:	BH13_0.4-0.5 10-Jul-2024	BH13_1.4-1.5 10-Jul-2024
		Lab Number:	3625593.2	3625593.4
Individual Tests				
Dry Matter	g/100g as rcvd		73	68
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt		5	3
Total Recoverable Cadmium	mg/kg dry wt		< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt		40	24
Total Recoverable Copper	mg/kg dry wt		36	9
Total Recoverable Lead	mg/kg dry wt		187	6.8
Total Recoverable Nickel	mg/kg dry wt		35	5
Total Recoverable Zinc	mg/kg dry wt		85	14
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil	mg/kg dry wt		1.8	< 0.4
1-Methylnaphthalene	mg/kg dry wt		< 0.014	< 0.015
2-Methylnaphthalene	mg/kg dry wt		< 0.03	< 0.03
Acenaphthylene	mg/kg dry wt		0.024	< 0.015
Acenaphthene	mg/kg dry wt		< 0.014	< 0.015
Anthracene	mg/kg dry wt		0.016	< 0.015
Benzo[a]anthracene	mg/kg dry wt		0.128	< 0.015
Benzo[a]pyrene (BAP)	mg/kg dry wt		0.190	< 0.015
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt		0.28	< 0.036
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt		0.27	< 0.036
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt		0.22	< 0.015
Benzo[e]pyrene	mg/kg dry wt		0.112	< 0.015
Benzo[g,h,i]perylene	mg/kg dry wt		0.145	< 0.015
Benzo[k]fluoranthene	mg/kg dry wt		0.077	< 0.015
Chrysene	mg/kg dry wt		0.104	< 0.015
Dibenzo[a,h]anthracene	mg/kg dry wt		0.027	< 0.015
Fluoranthene	mg/kg dry wt		0.22	< 0.015
Fluorene	mg/kg dry wt		< 0.014	< 0.015
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt		0.142	< 0.015
Naphthalene	mg/kg dry wt		< 0.07	< 0.08
Perylene	mg/kg dry wt		0.042	< 0.015
Phenanthrene	mg/kg dry wt		0.059	< 0.015
Pyrene	mg/kg dry wt		0.25	< 0.015

Sample Type: Soil			
Sample Name:		BH13_0.4-0.5 10-Jul-2024	BH13_1.4-1.5 10-Jul-2024
Lab Number:		3625593.2	3625593.4
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 20	< 30
C10 - C14	mg/kg dry wt	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 90

Summary of Methods

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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	2, 4
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	2, 4
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	2, 4
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	2, 4
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	2, 4
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	2, 4
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	2, 4
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	2, 4
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	2, 4
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	2, 4
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	2, 4

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

Testing was completed between 13-Jul-2024 and 17-Jul-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.

Martin Cowell - BSc
Client Services Manager - Environmental

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www.hill-labs.co.nz

Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3629193	SPv3
Contact:	Tiana Hill	**Date Received:**	17-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	12-Aug-2024	**(Amended)**
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290 - 064	
		Submitted By:	Andrew Allcock	

Sample Type: Soil

Sample Name:		BH39_0.5-0.6 16-Jul-2024	BH39_1.0-1.1 16-Jul-2024	BH39_1.5-1.6 16-Jul-2024
Lab Number:		3629193.1	3629193.2	3629193.3
Individual Tests				
Dry Matter	g/100g as rcvd	79	-	-
Total Recoverable Arsenic	mg/kg dry wt	-	4	-
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt	70	-	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	-	< 0.10
Total Recoverable Chromium	mg/kg dry wt	12	-	22
Total Recoverable Copper	mg/kg dry wt	10	-	21
Total Recoverable Lead	mg/kg dry wt	54	-	10.3
Total Recoverable Nickel	mg/kg dry wt	9	-	< 2
Total Recoverable Zinc	mg/kg dry wt	21	-	10
BTEX in Soil by Headspace GC-MS				
Benzene	mg/kg dry wt	< 0.06	-	-
Toluene	mg/kg dry wt	< 0.06	-	-
Ethylbenzene	mg/kg dry wt	< 0.06	-	-
m&p-Xylene	mg/kg dry wt	< 0.11	-	-
o-Xylene	mg/kg dry wt	< 0.06	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	< 0.013	-	-
Acenaphthene	mg/kg dry wt	< 0.013	-	-
Anthracene	mg/kg dry wt	< 0.013	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.013	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.030	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.030	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.013	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.013	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	-	-
Chrysene	mg/kg dry wt	< 0.013	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	-	-
Fluoranthene	mg/kg dry wt	< 0.013	-	-
Fluorene	mg/kg dry wt	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	-	-

Sample Type: Soil				
Sample Name:		BH39_0.5-0.6 16-Jul-2024	BH39_1.0-1.1 16-Jul-2024	BH39_1.5-1.6 16-Jul-2024
Lab Number:		3629193.1	3629193.2	3629193.3
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Naphthalene	mg/kg dry wt	< 0.07	-	-
Perylene	mg/kg dry wt	< 0.013	-	-
Phenanthrene	mg/kg dry wt	< 0.013	-	-
Pyrene	mg/kg dry wt	< 0.013	-	-
Total Petroleum Hydrocarbons in Soil				
C7 - C9	mg/kg dry wt	< 20	-	-
C10 - C14	mg/kg dry wt	< 20	-	-
C15 - C36	mg/kg dry wt	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	-	-

Analyst's Comments

It was observed that the container for sample {3629193.1} were not completely filled. Volatile loss may have occurred due to the headspace created in the container.

Amended Report: This certificate of analysis replaces report '3629193-SPv2' issued on 23-Jul-2024 at 3:27 pm.
Reason for amendment: Testing added to sample 2.

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
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	2
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
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
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	2
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	2
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
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
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1, 3
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	1

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1
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
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
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
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

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

Testing was completed between 18-Jul-2024 and 12-Aug-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.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3634409	SPv1
Contact:	Tiana Hill	**Date Received:**	24-Jul-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	29-Jul-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH21_5.4-5.5 22-Jul-2024	BH21_11.0-11.1 22-Jul-2024	BH21_16.4-16.5 22-Jul-2024	BH35_3.4-3.5 22-Jul-2024	BH35_4.0-4.1 22-Jul-2024
Lab Number:		3634409.1	3634409.2	3634409.3	3634409.4	3634409.5
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	63	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	2	3	24	11
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	0.11	< 0.10
Total Recoverable Chromium	mg/kg dry wt	8	12	13	38	9
Total Recoverable Copper	mg/kg dry wt	14	10	11	31	21
Total Recoverable Lead	mg/kg dry wt	6.6	4.3	5.1	46	5.9
Total Recoverable Nickel	mg/kg dry wt	9	11	10	94	64
Total Recoverable Zinc	mg/kg dry wt	10	43	40	15	118
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	< 0.4	-
1-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.016	-
2-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.016	-
Acenaphthylene	mg/kg dry wt	-	-	-	< 0.016	-
Acenaphthene	mg/kg dry wt	-	-	-	< 0.016	-
Anthracene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[a]anthracene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	< 0.039	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	< 0.039	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[e]pyrene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	< 0.016	-
Chrysene	mg/kg dry wt	-	-	-	< 0.016	-
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	< 0.016	-
Fluoranthene	mg/kg dry wt	-	-	-	< 0.016	-
Fluorene	mg/kg dry wt	-	-	-	< 0.016	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	< 0.016	-
Naphthalene	mg/kg dry wt	-	-	-	< 0.08	-
Perylene	mg/kg dry wt	-	-	-	< 0.016	-
Phenanthrene	mg/kg dry wt	-	-	-	< 0.016	-
Pyrene	mg/kg dry wt	-	-	-	< 0.016	-

Sample Type: Soil						
Sample Name:		BH21_5.4-5.5 22-Jul-2024	BH21_11.0-11.1 22-Jul-2024	BH21_16.4-16.5 22-Jul-2024	BH35_3.4-3.5 22-Jul-2024	BH35_4.0-4.1 22-Jul-2024
Lab Number:		3634409.1	3634409.2	3634409.3	3634409.4	3634409.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	< 30	-
C10 - C14	mg/kg dry wt	-	-	-	< 20	-
C15 - C36	mg/kg dry wt	-	-	-	< 40	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	< 90	-

Sample Name:		BH39_3.0-3.45 22-Jul-2024	BH39_6.0-6.45 22-Jul-2024	BH39_9.0-9.45 22-Jul-2024	BH39_12.0-12.45 22-Jul-2024	BH48_3.0-3.1 22-Jul-2024
Lab Number:		3634409.6	3634409.7	3634409.8	3634409.9	3634409.10
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	4	5	5	3
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	15	20	16	22	16
Total Recoverable Copper	mg/kg dry wt	33	30	31	25	15
Total Recoverable Lead	mg/kg dry wt	10.9	8.2	8.8	7.7	5.3
Total Recoverable Nickel	mg/kg dry wt	5	57	20	18	24
Total Recoverable Zinc	mg/kg dry wt	21	47	69	60	68

Sample Name:		BH48_6.5-6.7 22-Jul-2024	BH49_2.7-2.8 22-Jul-2024	BH49_5.0-5.1 22-Jul-2024	BH49_5.9-6.0 22-Jul-2024
Lab Number:		3634409.11	3634409.12	3634409.13	3634409.14
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	3	2	< 2	2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	25	19	19	20
Total Recoverable Copper	mg/kg dry wt	15	12	18	13
Total Recoverable Lead	mg/kg dry wt	5.0	4.8	6.6	4.4
Total Recoverable Nickel	mg/kg dry wt	25	3	< 2	12
Total Recoverable Zinc	mg/kg dry wt	59	21	5	36

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).	-	1-14
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	4
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	4
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	4
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	4

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	4
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	1-14
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	4
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	4
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	4
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	4

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

Testing was completed between 25-Jul-2024 and 29-Jul-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.

Kim Harrison MSc
Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3651482 SPv1
Contact:	Tiana Hill	**Date Received:**	16-Aug-2024
	C/- Aurecon New Zealand Limited	**Date Reported:**	21-Aug-2024
	PO Box 9762	**Quote No:**	126272
	Newmarket	**Order No:**	
	Auckland 1149	**Client Reference:**	521290-064
		Submitted By:	Tiana Hill

Sample Type: Soil

Sample Name:		BH44_0.3-0.4 14-Aug-2024	BH44_1.1-1.2 14-Aug-2024	BH44_3.0-3.4 15-Aug-2024	BH44_6.0-6.3 15-Aug-2024	BH44_10.5-10.6 15-Aug-2024
Lab Number:		3651482.1	3651482.2	3651482.3	3651482.4	3651482.5
Individual Tests						
Dry Matter	g/100g as rcvd	76	62	79	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	4	< 2	< 2	2
Total Recoverable Cadmium	mg/kg dry wt	0.17	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	15	22	18	24	27
Total Recoverable Copper	mg/kg dry wt	16	22	6	11	16
Total Recoverable Lead	mg/kg dry wt	54	45	15.3	6.1	5.4
Total Recoverable Nickel	mg/kg dry wt	14	18	5	12	14
Total Recoverable Zinc	mg/kg dry wt	61	47	41	31	45
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.7	1.1	< 0.3	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Acenaphthene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Anthracene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Benzo[a]anthracene	mg/kg dry wt	0.050	0.073	0.014	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.073	0.096	0.024	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.105	0.138	0.031	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.104	0.137	0.030	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.079	0.109	0.027	-	-
Benzo[e]pyrene	mg/kg dry wt	0.042	0.058	0.014	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.053	0.065	0.018	-	-
Benzo[k]fluoranthene	mg/kg dry wt	0.027	0.036	< 0.013	-	-
Chrysene	mg/kg dry wt	0.046	0.070	0.015	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Fluoranthene	mg/kg dry wt	0.107	0.168	0.039	-	-
Fluorene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.052	0.063	0.017	-	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.08	< 0.07	-	-
Perylene	mg/kg dry wt	0.017	0.023	< 0.013	-	-
Phenanthrene	mg/kg dry wt	0.034	0.088	0.017	-	-
Pyrene	mg/kg dry wt	0.118	0.168	0.038	-	-

Sample Type: Soil						
Sample Name:		BH44_0.3-0.4 14-Aug-2024	BH44_1.1-1.2 14-Aug-2024	BH44_3.0-3.4 15-Aug-2024	BH44_6.0-6.3 15-Aug-2024	BH44_10.5-10.6 15-Aug-2024
Lab Number:		3651482.1	3651482.2	3651482.3	3651482.4	3651482.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	< 30	< 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	< 90	< 80	-	-

Sample Name:		BH51_0.5-0.6 15-Aug-2024	BH51_2.0-2.45 15-Aug-2024
Lab Number:		3651482.6	3651482.7
Individual Tests			
Dry Matter	g/100g as rcvd	79	61
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	4	3
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	27	20
Total Recoverable Copper	mg/kg dry wt	34	8
Total Recoverable Lead	mg/kg dry wt	62	9.8
Total Recoverable Nickel	mg/kg dry wt	48	10
Total Recoverable Zinc	mg/kg dry wt	65	44
Polycyclic Aromatic Hydrocarbons Screening in Soil*			
Total of Reported PAHs in Soil	mg/kg dry wt	0.7	< 0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.016
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.016
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.016
Acenaphthene	mg/kg dry wt	< 0.013	< 0.016
Anthracene	mg/kg dry wt	< 0.013	< 0.016
Benzo[a]anthracene	mg/kg dry wt	0.057	< 0.016
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.066	< 0.016
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.100	< 0.039
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.099	< 0.038
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.083	< 0.016
Benzo[e]pyrene	mg/kg dry wt	0.038	< 0.016
Benzo[g,h,i]perylene	mg/kg dry wt	0.043	< 0.016
Benzo[k]fluoranthene	mg/kg dry wt	0.032	< 0.016
Chrysene	mg/kg dry wt	0.050	< 0.016
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.016
Fluoranthene	mg/kg dry wt	0.103	< 0.016
Fluorene	mg/kg dry wt	< 0.013	< 0.016
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.051	< 0.016
Naphthalene	mg/kg dry wt	< 0.07	< 0.08
Perylene	mg/kg dry wt	0.024	< 0.016
Phenanthrene	mg/kg dry wt	0.017	< 0.016
Pyrene	mg/kg dry wt	0.110	< 0.016
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 20	< 30
C10 - C14	mg/kg dry wt	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 90

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-7
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	1-3, 6-7
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	1-3, 6-7
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	1-3, 6-7
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	1-3, 6-7
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	1-3, 6-7
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-7
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3, 6-7
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3, 6-7
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-3, 6-7
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	1-3, 6-7

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

Testing was completed between 17-Aug-2024 and 21-Aug-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.

Ara Heron BSc (Tech)
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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3655466	SPv2
Contact:	Andrew Allcock	**Date Received:**	22-Aug-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	28-Aug-2024	**(Amended)**
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**	126272	
	Auckland 1149	**Client Reference:**	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH46_0.4-0.5 19-Aug-2024	BH46_1.4-1.6 19-Aug-2024	BH45_0.8-1.0 19-Aug-2024	BH51_5.0-5.45 15-Aug-2024	BH51_8.0-8.45 15-Aug-2024
Lab Number:		3655466.1	3655466.2	3655466.3	3655466.4	3655466.5
Individual Tests						
Dry Matter	g/100g as rcvd	78	80	76	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	3	5	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	21	20	22	14	23
Total Recoverable Copper	mg/kg dry wt	16	16	26	9	21
Total Recoverable Lead	mg/kg dry wt	27	16.7	47	7.3	8.4
Total Recoverable Nickel	mg/kg dry wt	12	12	18	11	21
Total Recoverable Zinc	mg/kg dry wt	41	43	80	36	52
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	3.3	< 0.3	2.2	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	0.037	< 0.013	0.027	-	-
Acenaphthene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	-	-
Anthracene	mg/kg dry wt	0.051	< 0.013	0.023	-	-
Benzo[a]anthracene	mg/kg dry wt	0.21	0.016	0.147	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.173	0.013	0.125	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.30	< 0.030	0.22	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.30	< 0.030	0.21	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.30	0.024	0.21	-	-
Benzo[e]pyrene	mg/kg dry wt	0.28	0.021	0.20	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.22	0.018	0.165	-	-
Benzo[k]fluoranthene	mg/kg dry wt	0.115	< 0.013	0.080	-	-
Chrysene	mg/kg dry wt	0.21	0.015	0.140	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.039	< 0.013	0.028	-	-
Fluoranthene	mg/kg dry wt	0.58	0.047	0.36	-	-
Fluorene	mg/kg dry wt	0.013	< 0.013	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.21	0.016	0.154	-	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	< 0.07	-	-
Perylene	mg/kg dry wt	0.072	< 0.013	0.053	-	-
Phenanthrene	mg/kg dry wt	0.196	0.013	0.093	-	-
Pyrene	mg/kg dry wt	0.56	0.047	0.38	-	-

Sample Type: Soil						
Sample Name:		BH46_0.4-0.5 19-Aug-2024	BH46_1.4-1.6 19-Aug-2024	BH45_0.8-1.0 19-Aug-2024	BH51_5.0-5.45 15-Aug-2024	BH51_8.0-8.45 15-Aug-2024
Lab Number:		3655466.1	3655466.2	3655466.3	3655466.4	3655466.5
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	-	-

Sample Name:		BH51_12.0-12.33 15-Aug-2024
Lab Number:		3655466.6
Heavy Metals, Screen Level		
Total Recoverable Arsenic	mg/kg dry wt	2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10
Total Recoverable Chromium	mg/kg dry wt	23
Total Recoverable Copper	mg/kg dry wt	20
Total Recoverable Lead	mg/kg dry wt	5.8
Total Recoverable Nickel	mg/kg dry wt	17
Total Recoverable Zinc	mg/kg dry wt	49

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3655466-SPv1' issued on 28-Aug-2024 at 9:52 am. Reason for amendment: IDs updated.

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).	-	1-6
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-3
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-3
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	1-3
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	1-3
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	1-3
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-6
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-3
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	1-3

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

Testing was completed between 24-Aug-2024 and 28-Aug-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.

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Certificate of Analysis

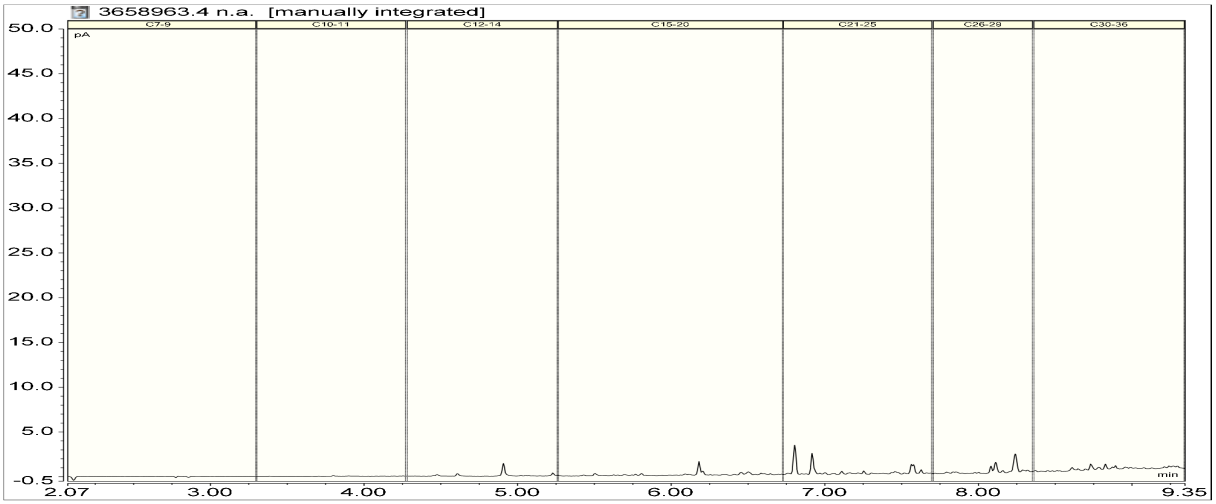
Client:	Aurecon New Zealand Limited	**Lab No:**	3658963	SPv1
Contact:	Tiana Hill	**Date Received:**	28-Aug-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	02-Sep-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH46_3.5-3.6 23-Aug-2024	BH46_8.5-8.7 23-Aug-2024	BH46_12.0-12.1 23-Aug-2024	BH25_0.2-0.3 26-Aug-2024	BH25_1.5-1.6 26-Aug-2024
Lab Number:		3658963.1	3658963.2	3658963.3	3658963.4	3658963.5
Individual Tests						
Dry Matter	g/100g as rcvd	74	-	-	69	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	3	< 2	3	3
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	24	19	28	26	11
Total Recoverable Copper	mg/kg dry wt	22	19	19	30	5
Total Recoverable Lead	mg/kg dry wt	75	5.6	4.4	21	12.4
Total Recoverable Nickel	mg/kg dry wt	18	19	15	48	3
Total Recoverable Zinc	mg/kg dry wt	65	52	51	35	16
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	9.7	-	-	23	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-	0.030	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-	0.019	-
Acenaphthylene	mg/kg dry wt	0.121	-	-	0.025	-
Acenaphthene	mg/kg dry wt	< 0.013	-	-	0.195	-
Anthracene	mg/kg dry wt	0.25	-	-	0.85	-
Benzo[a]anthracene	mg/kg dry wt	0.76	-	-	1.73	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.77	-	-	1.78	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	1.12	-	-	2.6	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	1.11	-	-	2.6	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.80	-	-	1.81	-
Benzo[e]pyrene	mg/kg dry wt	0.43	-	-	0.97	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.46	-	-	1.06	-
Benzo[k]fluoranthene	mg/kg dry wt	0.32	-	-	0.71	-
Chrysene	mg/kg dry wt	0.66	-	-	1.59	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.098	-	-	0.23	-
Fluoranthene	mg/kg dry wt	1.79	-	-	3.7	-
Fluorene	mg/kg dry wt	0.050	-	-	0.23	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.46	-	-	1.10	-
Naphthalene	mg/kg dry wt	< 0.07	-	-	< 0.08	-
Perylene	mg/kg dry wt	0.172	-	-	0.41	-
Phenanthrene	mg/kg dry wt	0.76	-	-	2.8	-
Pyrene	mg/kg dry wt	1.75	-	-	4.0	-

Sample Type: Soil						
Sample Name:		BH46_3.5-3.6 23-Aug-2024	BH46_8.5-8.7 23-Aug-2024	BH46_12.0-12.1 23-Aug-2024	BH25_0.2-0.3 26-Aug-2024	BH25_1.5-1.6 26-Aug-2024
Lab Number:		3658963.1	3658963.2	3658963.3	3658963.4	3658963.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	-	-	< 30	-
C10 - C14	mg/kg dry wt	< 20	-	-	< 20	-
C15 - C36	mg/kg dry wt	< 40	-	-	141	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	-	-	143	-

3658963.4
BH25_0.2-0.3 26-Aug-2024
Client Chromatogram for TPH by FID



Summary of Methods

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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1, 4
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, 4
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, 4
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, 4
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, 4

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-5
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	4
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1, 4
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, 4
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, 4
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, 4

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

Testing was completed between 29-Aug-2024 and 02-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3664138 SPv1
Contact:	Tiana Hill	**Date Received:**	04-Sep-2024
	C/- Aurecon New Zealand Limited	**Date Reported:**	09-Sep-2024
	PO Box 9762	**Quote No:**	126272
	Newmarket	**Order No:**	
	Auckland 1149	**Client Reference:**	521290-064
		Submitted By:	Tiana Hill

Sample Type: Soil

		Sample Name:	BH06_0.4-0.5 29-Aug-2024	BH06_1.4-1.5 29-Aug-2024
		Lab Number:	3664138.1	3664138.2
Individual Tests				
Dry Matter	g/100g as rcvd		72	-
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt		5	3
Total Recoverable Cadmium	mg/kg dry wt		< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt		22	23
Total Recoverable Copper	mg/kg dry wt		26	35
Total Recoverable Lead	mg/kg dry wt		89	8.9
Total Recoverable Nickel	mg/kg dry wt		22	5
Total Recoverable Zinc	mg/kg dry wt		68	30
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil	mg/kg dry wt		3.4	-
1-Methylnaphthalene	mg/kg dry wt		< 0.014	-
2-Methylnaphthalene	mg/kg dry wt		< 0.014	-
Acenaphthylene	mg/kg dry wt		0.040	-
Acenaphthene	mg/kg dry wt		< 0.014	-
Anthracene	mg/kg dry wt		0.057	-
Benzo[a]anthracene	mg/kg dry wt		0.22	-
Benzo[a]pyrene (BAP)	mg/kg dry wt		0.35	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt		0.49	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt		0.49	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt		0.36	-
Benzo[e]pyrene	mg/kg dry wt		0.199	-
Benzo[g,h,i]perylene	mg/kg dry wt		0.27	-
Benzo[k]fluoranthene	mg/kg dry wt		0.141	-
Chrysene	mg/kg dry wt		0.20	-
Dibenzo[a,h]anthracene	mg/kg dry wt		0.041	-
Fluoranthene	mg/kg dry wt		0.44	-
Fluorene	mg/kg dry wt		< 0.014	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt		0.27	-
Naphthalene	mg/kg dry wt		< 0.07	-
Perylene	mg/kg dry wt		0.092	-
Phenanthrene	mg/kg dry wt		0.129	-
Pyrene	mg/kg dry wt		0.51	-

Sample Type: Soil			
Sample Name:		BH06_0.4-0.5 29-Aug-2024	BH06_1.4-1.5 29-Aug-2024
Lab Number:		3664138.1	3664138.2
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 20	-
C10 - C14	mg/kg dry wt	< 20	-
C15 - C36	mg/kg dry wt	< 40	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 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
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
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
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
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
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
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
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
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
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
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

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

Testing was completed between 05-Sep-2024 and 09-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3670643	SPv1
Contact:	Tiana Hill C/- Aurecon New Zealand Limited PO Box 9762 Newmarket Auckland 1149	**Date Received:**	12-Sep-2024	
		Date Reported:	16-Sep-2024	
		Quote No:	126272	
		Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH36_0.6-0.7 12-Sep-2024	BH36_2.5-2.6 12-Sep-2024	BH06_12.0-12.1 12-Sep-2024	BH25_16.5-16.6 12-Sep-2024	BH17_1.5-1.95 05-Sep-2024
Lab Number:		3670643.1	3670643.2	3670643.3	3670643.4	3670643.5
Individual Tests						
Dry Matter	g/100g as rcvd	66	-	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 2	3	4	3	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	14	15	20	10	9
Total Recoverable Copper	mg/kg dry wt	4	9	23	11	3
Total Recoverable Lead	mg/kg dry wt	6.5	6.3	6.3	4.7	7.3
Total Recoverable Nickel	mg/kg dry wt	4	< 2	33	11	2
Total Recoverable Zinc	mg/kg dry wt	5	7	70	36	7
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.015	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.015	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.015	-	-	-	-
Acenaphthene	mg/kg dry wt	< 0.015	-	-	-	-
Anthracene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.036	-	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.036	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.015	-	-	-	-
Chrysene	mg/kg dry wt	< 0.015	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.015	-	-	-	-
Fluoranthene	mg/kg dry wt	< 0.015	-	-	-	-
Fluorene	mg/kg dry wt	< 0.015	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.015	-	-	-	-
Naphthalene	mg/kg dry wt	< 0.08	-	-	-	-
Perylene	mg/kg dry wt	< 0.015	-	-	-	-
Phenanthrene	mg/kg dry wt	< 0.015	-	-	-	-
Pyrene	mg/kg dry wt	< 0.015	-	-	-	-

Sample Type: Soil						
Sample Name:		BH36_0.6-0.7 12-Sep-2024	BH36_2.5-2.6 12-Sep-2024	BH06_12.0-12.1 12-Sep-2024	BH25_16.5-16.6 12-Sep-2024	BH17_1.5-1.95 05-Sep-2024
Lab Number:		3670643.1	3670643.2	3670643.3	3670643.4	3670643.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 30	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	< 40	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 90	-	-	-	-

Sample Name:		BH17_7.5-7.95 05-Sep-2024	BH17_13.5-13.64 06-Sep-2024
Lab Number:		3670643.6	3670643.7
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	2	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	19	26
Total Recoverable Copper	mg/kg dry wt	25	16
Total Recoverable Lead	mg/kg dry wt	7.7	5.2
Total Recoverable Nickel	mg/kg dry wt	16	22
Total Recoverable Zinc	mg/kg dry wt	23	40

Summary of Methods

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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-7
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
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
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
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
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
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-7
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
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
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
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

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

Testing was completed between 13-Sep-2024 and 16-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3674838	SPv1
Contact:	Tiana Hill	**Date Received:**	18-Sep-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	23-Sep-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-64	
		Submitted By:	Tiana Hill	

Sample Type: Soil

		Sample Name:	BH38_1.1-1.2 18-Sep-2024	BH14_0.6-0.7 16-Sep-2024
		Lab Number:	3674838.1	3674838.2
Individual Tests				
Dry Matter	g/100g as rcvd		79	70
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt		< 2	8
Total Recoverable Cadmium	mg/kg dry wt		< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt		7	23
Total Recoverable Copper	mg/kg dry wt		4	18
Total Recoverable Lead	mg/kg dry wt		16.9	114
Total Recoverable Nickel	mg/kg dry wt		2	24
Total Recoverable Zinc	mg/kg dry wt		10	46
BTEX in Soil by Headspace GC-MS				
Benzene	mg/kg dry wt		< 0.06	< 0.07
Toluene	mg/kg dry wt		< 0.06	< 0.07
Ethylbenzene	mg/kg dry wt		< 0.06	< 0.07
m&p-Xylene	mg/kg dry wt		< 0.11	< 0.13
o-Xylene	mg/kg dry wt		< 0.06	< 0.07
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil	mg/kg dry wt		-	2.4
1-Methylnaphthalene	mg/kg dry wt		-	< 0.014
2-Methylnaphthalene	mg/kg dry wt		-	< 0.014
Acenaphthylene	mg/kg dry wt		-	0.019
Acenaphthene	mg/kg dry wt		-	< 0.014
Anthracene	mg/kg dry wt		-	0.026
Benzo[a]anthracene	mg/kg dry wt		-	0.175
Benzo[a]pyrene (BAP)	mg/kg dry wt		-	0.25
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt		-	0.36
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt		-	0.35
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt		-	0.23
Benzo[e]pyrene	mg/kg dry wt		-	0.134
Benzo[g,h,i]perylene	mg/kg dry wt		-	0.180
Benzo[k]fluoranthene	mg/kg dry wt		-	0.102
Chrysene	mg/kg dry wt		-	0.164
Dibenzo[a,h]anthracene	mg/kg dry wt		-	0.033
Fluoranthene	mg/kg dry wt		-	0.33
Fluorene	mg/kg dry wt		-	< 0.014
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt		-	0.168
Naphthalene	mg/kg dry wt		-	< 0.07

Sample Type: Soil			
Sample Name:		BH38_1.1-1.2 18-Sep-2024	BH14_0.6-0.7 16-Sep-2024
Lab Number:		3674838.1	3674838.2
Polycyclic Aromatic Hydrocarbons Screening in Soil*			
Perylene	mg/kg dry wt	-	0.063
Phenanthrene	mg/kg dry wt	-	0.110
Pyrene	mg/kg dry wt	-	0.41
Haloethers in SVOC Soil Samples by GC-MS			
Bis(2-chloroethoxy) methane	mg/kg dry wt	< 0.5	-
Bis(2-chloroethyl)ether	mg/kg dry wt	< 0.5	-
Bis(2-chloroisopropyl)ether	mg/kg dry wt	< 0.5	-
4-Bromophenyl phenyl ether	mg/kg dry wt	< 0.4	-
4-Chlorophenyl phenyl ether	mg/kg dry wt	< 0.5	-
Nitrogen containing compounds in SVOC Soil Samples by GC-MS			
2,4-Dinitrotoluene	mg/kg dry wt	< 1.0	-
2,6-Dinitrotoluene	mg/kg dry wt	< 1.0	-
Nitrobenzene	mg/kg dry wt	< 0.5	-
N-Nitrosodi-n-propylamine	mg/kg dry wt	< 0.8	-
N-Nitrosodiphenylamine + Diphenylamine	mg/kg dry wt	< 0.8	-
Organochlorine Pesticides in SVOC Soil Samples by GC-MS			
Aldrin	mg/kg dry wt	< 0.5	-
alpha-BHC	mg/kg dry wt	< 0.5	-
beta-BHC	mg/kg dry wt	< 0.5	-
delta-BHC	mg/kg dry wt	< 0.5	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.5	-
4,4'-DDD	mg/kg dry wt	< 0.5	-
4,4'-DDE	mg/kg dry wt	< 0.5	-
4,4'-DDT	mg/kg dry wt	< 1.0	-
Dieldrin	mg/kg dry wt	< 0.5	-
Endosulfan I	mg/kg dry wt	< 1.0	-
Endosulfan II	mg/kg dry wt	< 2	-
Endosulfan sulphate	mg/kg dry wt	< 1.0	-
Endrin	mg/kg dry wt	< 0.8	-
Endrin ketone	mg/kg dry wt	< 1.0	-
Heptachlor	mg/kg dry wt	< 0.5	-
Heptachlor epoxide	mg/kg dry wt	< 0.5	-
Hexachlorobenzene	mg/kg dry wt	< 0.5	-
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*			
Acenaphthene	mg/kg dry wt	< 0.5	-
Acenaphthylene	mg/kg dry wt	< 0.5	-
Anthracene	mg/kg dry wt	< 0.5	-
Benzo[a]anthracene	mg/kg dry wt	< 0.5	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.5	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.5	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.5	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.5	-
1&2-Chloronaphthalene	mg/kg dry wt	< 0.5	-
Chrysene	mg/kg dry wt	< 0.5	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.5	-
Fluoranthene	mg/kg dry wt	< 0.5	-
Fluorene	mg/kg dry wt	< 0.5	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.5	-
2-Methylnaphthalene	mg/kg dry wt	< 0.5	-
Naphthalene	mg/kg dry wt	< 0.5	-
Phenanthrene	mg/kg dry wt	< 0.5	-
Pyrene	mg/kg dry wt	< 0.5	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 1.3	-

Sample Type: Soil			
Sample Name:		BH38_1.1-1.2 18-Sep-2024	BH14_0.6-0.7 16-Sep-2024
Lab Number:		3674838.1	3674838.2
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*			
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 1.3	-
Phenols in SVOC Soil Samples by GC-MS			
4-Chloro-3-methylphenol	mg/kg dry wt	< 5	-
2-Chlorophenol	mg/kg dry wt	< 1.0	-
2,4-Dichlorophenol	mg/kg dry wt	< 1.0	-
2,4-Dimethylphenol	mg/kg dry wt	< 3	-
3 & 4-Methylphenol (m- + p-cresol)	mg/kg dry wt	< 3	-
2-Methylphenol (o-cresol)	mg/kg dry wt	< 1.0	-
2-Nitrophenol	mg/kg dry wt	< 5	-
Pentachlorophenol (PCP)	mg/kg dry wt	< 30	-
Phenol	mg/kg dry wt	< 1.0	-
2,4,5-Trichlorophenol	mg/kg dry wt	< 1.0	-
2,4,6-Trichlorophenol	mg/kg dry wt	< 1.0	-
Plasticisers in SVOC Soil Samples by GC-MS			
Bis(2-ethylhexyl)phthalate	mg/kg dry wt	< 5	-
Butylbenzylphthalate	mg/kg dry wt	< 1.0	-
Di(2-ethylhexyl)adipate	mg/kg dry wt	< 1.0	-
Diethylphthalate	mg/kg dry wt	< 1.0	-
Dimethylphthalate	mg/kg dry wt	< 1.0	-
Di-n-butylphthalate	mg/kg dry wt	< 1.0	-
Di-n-octylphthalate	mg/kg dry wt	< 1.0	-
Other Halogenated compounds in SVOC Soil Samples by GC-MS			
1,2-Dichlorobenzene	mg/kg dry wt	< 0.8	-
1,3-Dichlorobenzene	mg/kg dry wt	< 0.8	-
1,4-Dichlorobenzene	mg/kg dry wt	< 0.8	-
Hexachlorobutadiene	mg/kg dry wt	< 0.8	-
Hexachloroethane	mg/kg dry wt	< 0.8	-
1,2,4-Trichlorobenzene	mg/kg dry wt	< 0.5	-
Other compounds in SVOC Soil Samples by GC-MS			
Benzyl alcohol	mg/kg dry wt	< 10	-
Carbazole	mg/kg dry wt	< 0.5	-
Dibenzofuran	mg/kg dry wt	< 0.5	-
Isophorone	mg/kg dry wt	< 0.5	-
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 20	< 20
C10 - C14	mg/kg dry wt	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 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
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	2

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
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
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	2
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	2
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
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	1-2
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	2
Semivolatile Organic Compounds Screening in Soil by GC-MS	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.024 - 30 mg/kg dry wt	1
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
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
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
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

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

Testing was completed between 19-Sep-2024 and 23-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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Certificate of Analysis

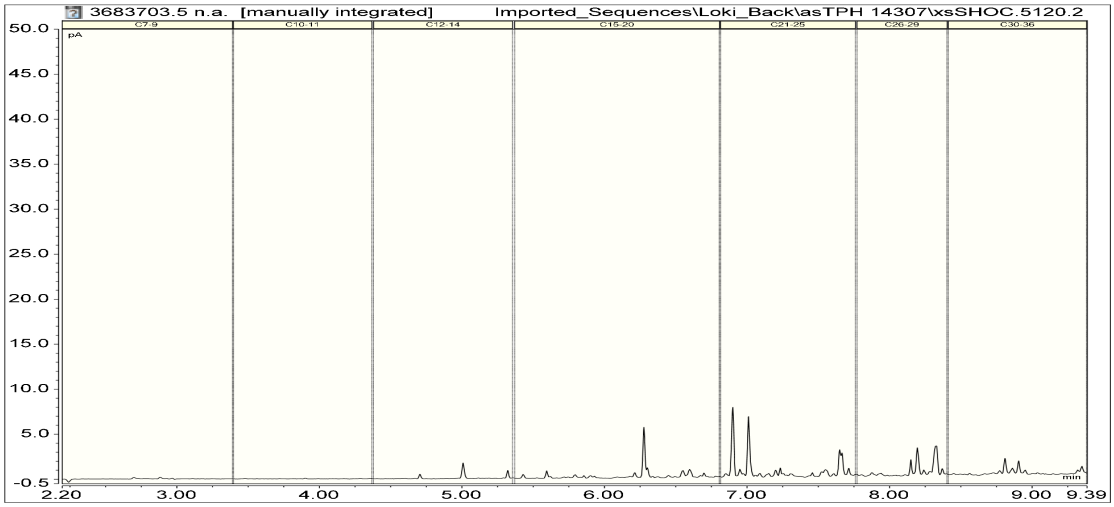
Client:	Aurecon New Zealand Limited	**Lab No:**	3683703	SPv1
Contact:	Tiana Hill C/- Aurecon New Zealand Limited PO Box 9762 Newmarket Auckland 1149	**Date Received:**	01-Oct-2024	
		Date Reported:	04-Oct-2024	
		Quote No:	126272	
		Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH36_5.45 12-Sep-2024	BH14_10.0-10.1 30-Sep-2024	BH14_2.5-2.6 30-Sep-2024	BH43_2.3 25-Sep-2024	BH43_0.5-0.6 24-Sep-2024
Lab Number:		3683703.1	3683703.2	3683703.3	3683703.4	3683703.5
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	-	75
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	2	< 2	< 2	5
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	10	20	7	35	16
Total Recoverable Copper	mg/kg dry wt	34	10	2	23	17
Total Recoverable Lead	mg/kg dry wt	10.6	3.9	3.7	17.2	92
Total Recoverable Nickel	mg/kg dry wt	20	10	< 2	14	9
Total Recoverable Zinc	mg/kg dry wt	123	42	5	64	76
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	-	45
1-Methylnaphthalene	mg/kg dry wt	-	-	-	-	0.020
2-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.013
Acenaphthylene	mg/kg dry wt	-	-	-	-	0.54
Acenaphthene	mg/kg dry wt	-	-	-	-	0.057
Anthracene	mg/kg dry wt	-	-	-	-	1.13
Benzo[a]anthracene	mg/kg dry wt	-	-	-	-	3.0
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	-	3.4
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	4.9
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	4.9
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	-	3.5
Benzo[e]pyrene	mg/kg dry wt	-	-	-	-	1.80
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	-	2.3
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	-	1.27
Chrysene	mg/kg dry wt	-	-	-	-	2.5
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	-	0.42
Fluoranthene	mg/kg dry wt	-	-	-	-	7.8
Fluorene	mg/kg dry wt	-	-	-	-	0.42
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	-	2.2
Naphthalene	mg/kg dry wt	-	-	-	-	< 0.07
Perylene	mg/kg dry wt	-	-	-	-	0.81
Phenanthrene	mg/kg dry wt	-	-	-	-	6.2
Pyrene	mg/kg dry wt	-	-	-	-	7.8

Sample Type: Soil						
Sample Name:		BH36_5.45 12-Sep-2024	BH14_10.0-10.1 30-Sep-2024	BH14_2.5-2.6 30-Sep-2024	BH43_2.3 25-Sep-2024	BH43_0.5-0.6 24-Sep-2024
Lab Number:		3683703.1	3683703.2	3683703.3	3683703.4	3683703.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	-	< 20
C10 - C14	mg/kg dry wt	-	-	-	-	< 20
C15 - C36	mg/kg dry wt	-	-	-	-	177
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	-	179

3683703.5
BH43_0.5-0.6 24-Sep-2024
Client Chromatogram for TPH by FID



Summary of Methods

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

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

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-5
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	5
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	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	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	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	5

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

Testing was completed between 02-Oct-2024 and 04-Oct-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3684098	SPv1
Contact:	Tiana Hill	**Date Received:**	01-Oct-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	08-Oct-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

		Sample Name:	QAQC_01 29-Aug-2024	QAQC_02 05-Jul-2024	QAQC_03 10-Jul-2024	QAQC_04 26-Aug-2024	QAQC_05
		Lab Number:	3684098.1	3684098.2	3684098.3	3684098.4	3684098.5
Heavy Metals, Screen Level							
Total Recoverable Arsenic	mg/kg dry wt		5	2	3	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt		28	15	22	7	14
Total Recoverable Copper	mg/kg dry wt		30	10	9	3	4
Total Recoverable Lead	mg/kg dry wt		12.6	20	6.4	12.8	7.4
Total Recoverable Nickel	mg/kg dry wt		8	11	4	2	3
Total Recoverable Zinc	mg/kg dry wt		35	41	16	12	9

		Sample Name:	QAQC_06	QAQC_07	QAQC_08
		Lab Number:	3684098.6	3684098.7	3684098.8
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt		9	4	< 2
Total Recoverable Cadmium	mg/kg dry wt		< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt		9	21	27
Total Recoverable Copper	mg/kg dry wt		3	20	21
Total Recoverable Lead	mg/kg dry wt		14.5	9.2	13.6
Total Recoverable Nickel	mg/kg dry wt		5	< 2	13
Total Recoverable Zinc	mg/kg dry wt		6	9	55

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
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).	-	1-8
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	1-8

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

Testing was completed between 02-Oct-2024 and 08-Oct-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.

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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3610977 SPv1
Contact:	Tiana Hill	**Date Received:**	20-Jun-2024
	C/- Aurecon New Zealand Limited	**Date Reported:**	27-Jun-2024
	PO Box 2292	**Quote No:**	126272
	Tauranga 3140	**Order No:**	
		Client Reference:	521290-064
		Submitted By:	Tiana Hill

Sample Type: Aqueous

Sample Name:		BH15_01 20-Jun-2024
Lab Number:		3610977.1
Individual Tests		
Dissolved Mercury	g/m³	< 0.00008
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn		
Dissolved Arsenic	g/m³	0.0021
Dissolved Cadmium	g/m³	< 0.00005
Dissolved Chromium	g/m³	< 0.0005
Dissolved Copper	g/m³	0.0017
Dissolved Lead	g/m³	< 0.00010
Dissolved Nickel	g/m³	0.0016
Dissolved Zinc	g/m³	< 0.0010

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: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m³	1
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1
Filtration for dissolved metals analysis - Misc	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1
Dissolved Mercury	0.45µm filtration, bromine oxidation followed by atomic fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m³	1

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

Testing was completed between 24-Jun-2024 and 27-Jun-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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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3680726	SPv1
Contact:	Tiana Hill C/- Aurecon New Zealand Limited PO Box 9762 Newmarket Auckland 1149	**Date Received:**	26-Sep-2024	
		Date Reported:	04-Oct-2024	
		Quote No:	126272	
		Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Aqueous

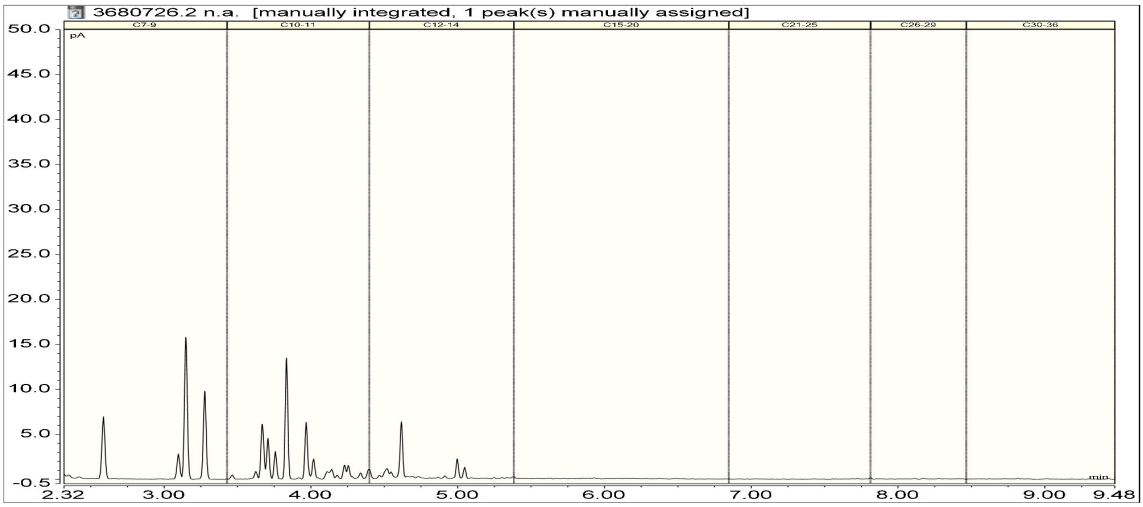
Sample Name:		BH06_01 26-Sep-2024 12:40 pm	BH14_01 26-Sep-2024 11:50 am	BH51_01 26-Sep-2024 11:00 am	BH44_01 26-Sep-2024 2:50 pm	BH46_02 26-Sep-2024 2:25 pm
Lab Number:		3680726.1	3680726.2	3680726.3	3680726.4	3680726.5
Individual Tests						
Total Suspended Solids	g/m³	4,200	1,340	96	-	36,000
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	0.0019	< 0.0010
Dissolved Cadmium	g/m³	0.00017	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	0.0006	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	0.0026	0.0026	0.0013	0.0010	0.0012
Dissolved Lead	g/m³	0.00017	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	0.034	0.0010	0.0054	0.0034	0.0027
Dissolved Zinc	g/m³	0.062	0.0035	0.0049	0.0024	0.0117
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Acenaphthylene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Anthracene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Chrysene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Fluoranthene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Fluorene	g/m³	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Naphthalene	g/m³	< 0.0005	0.099	-	< 0.0005	< 0.0005
Phenanthrene	g/m³	< 0.0004	< 0.0004	-	< 0.0004	< 0.0004
Pyrene	g/m³	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002
Haloethers in SVOC Water Samples by GC-MS						
Bis(2-chloroethoxy) methane	g/m³	-	< 0.005	-	< 0.005	< 0.005
Bis(2-chloroethyl)ether	g/m³	-	< 0.005	-	< 0.005	< 0.005
Bis(2-chloroisopropyl)ether	g/m³	-	< 0.005	-	< 0.005	< 0.005
4-Bromophenyl phenyl ether	g/m³	-	< 0.005	-	< 0.005	< 0.005
4-Chlorophenyl phenyl ether	g/m³	-	< 0.005	-	< 0.005	< 0.005

Sample Type: Aqueous						
Sample Name:		BH06_01 26-Sep-2024 12:40 pm	BH14_01 26-Sep-2024 11:50 am	BH51_01 26-Sep-2024 11:00 am	BH44_01 26-Sep-2024 2:50 pm	BH46_02 26-Sep-2024 2:25 pm
Lab Number:		3680726.1	3680726.2	3680726.3	3680726.4	3680726.5
Nitrogen containing compounds in SVOC Water Samples by GC-MS*						
2,4-Dinitrotoluene	g/m³	-	< 0.010	-	< 0.010	< 0.010
2,6-Dinitrotoluene	g/m³	-	< 0.010	-	< 0.010	< 0.010
Nitrobenzene	g/m³	-	< 0.005	-	< 0.005	< 0.005
N-Nitrosodi-n-propylamine	g/m³	-	< 0.010	-	< 0.010	< 0.010
N-Nitrosodiphenylamine + Diphenylamine*	g/m³	-	< 0.010	-	< 0.010	< 0.010
Organochlorine Pesticides in SVOC Water Samples by GC-MS						
Aldrin	g/m³	-	< 0.005	-	< 0.005	< 0.005
alpha-BHC	g/m³	-	< 0.005	-	< 0.005	< 0.005
beta-BHC	g/m³	-	< 0.005	-	< 0.005	< 0.005
delta-BHC	g/m³	-	< 0.005	-	< 0.005	< 0.005
gamma-BHC (Lindane)	g/m³	-	< 0.005	-	< 0.005	< 0.005
4,4'-DDD	g/m³	-	< 0.005	-	< 0.005	< 0.005
4,4'-DDE	g/m³	-	< 0.005	-	< 0.005	< 0.005
4,4'-DDT	g/m³	-	< 0.010	-	< 0.010	< 0.010
Dieldrin	g/m³	-	< 0.005	-	< 0.005	< 0.005
Endosulfan I	g/m³	-	< 0.010	-	< 0.010	< 0.010
Endosulfan II	g/m³	-	< 0.010	-	< 0.010	< 0.010
Endosulfan sulphate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Endrin	g/m³	-	< 0.010	-	< 0.010	< 0.010
Endrin ketone	g/m³	-	< 0.010	-	< 0.010	< 0.010
Heptachlor	g/m³	-	< 0.005	-	< 0.005	< 0.005
Heptachlor epoxide	g/m³	-	< 0.005	-	< 0.005	< 0.005
Hexachlorobenzene	g/m³	-	< 0.005	-	< 0.005	< 0.005
Polycyclic Aromatic Hydrocarbons in SVOC Water Samples by GC-MS						
Acenaphthene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Acenaphthylene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Anthracene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Benzo[a]anthracene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Benzo[a]pyrene (BAP)	g/m³	-	< 0.003	-	< 0.003	< 0.003
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Benzo[g,h,i]perylene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Benzo[k]fluoranthene	g/m³	-	< 0.003	-	< 0.003	< 0.003
1&2-Chloronaphthalene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Chrysene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Dibenzo[a,h]anthracene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Fluoranthene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Fluorene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Indeno(1,2,3-c,d)pyrene	g/m³	-	< 0.003	-	< 0.003	< 0.003
2-Methylnaphthalene	g/m³	-	0.023	-	< 0.003	< 0.003
Naphthalene	g/m³	-	0.065	-	< 0.003	< 0.003
Phenanthrene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Pyrene	g/m³	-	< 0.003	-	< 0.003	< 0.003
Phenols in SVOC Water Samples by GC-MS						
4-Chloro-3-methylphenol	g/m³	-	< 0.010	-	< 0.010	< 0.010
2-Chlorophenol	g/m³	-	< 0.005	-	< 0.005	< 0.005
2,4-Dichlorophenol	g/m³	-	< 0.005	-	< 0.005	< 0.005
2,4-Dimethylphenol	g/m³	-	< 0.005	-	< 0.005	< 0.005
3 & 4-Methylphenol (m- + p-cresol)	g/m³	-	< 0.010	-	< 0.010	< 0.010
2-Methylphenol (o-Cresol)	g/m³	-	< 0.005	-	< 0.005	< 0.005
2-Nitrophenol	g/m³	-	< 0.010	-	< 0.010	< 0.010
Pentachlorophenol (PCP)	g/m³	-	< 0.10	-	< 0.10	< 0.10
Phenol	g/m³	-	< 0.010	-	< 0.010	< 0.010

Sample Type: Aqueous						
Sample Name:		BH06_01 26-Sep-2024 12:40 pm	BH14_01 26-Sep-2024 11:50 am	BH51_01 26-Sep-2024 11:00 am	BH44_01 26-Sep-2024 2:50 pm	BH46_02 26-Sep-2024 2:25 pm
Lab Number:		3680726.1	3680726.2	3680726.3	3680726.4	3680726.5
Phenols in SVOC Water Samples by GC-MS						
2,4,5-Trichlorophenol	g/m³	-	< 0.010	-	< 0.010	< 0.010
2,4,6-Trichlorophenol	g/m³	-	< 0.010	-	< 0.010	< 0.010
Plasticisers in SVOC Water Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	g/m³	-	< 0.03	-	< 0.03	< 0.03
Butylbenzylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Di(2-ethylhexyl)adipate	g/m³	-	< 0.005	-	< 0.005	< 0.005
Diethylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Dimethylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Di-n-butylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Di-n-octylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Other Halogenated compounds in SVOC Water Samples by GC-MS						
1,2-Dichlorobenzene	g/m³	-	< 0.010	-	< 0.010	< 0.010
1,3-Dichlorobenzene	g/m³	-	< 0.010	-	< 0.010	< 0.010
1,4-Dichlorobenzene	g/m³	-	< 0.010	-	< 0.010	< 0.010
Hexachlorobutadiene	g/m³	-	< 0.010	-	< 0.010	< 0.010
Hexachloroethane	g/m³	-	< 0.010	-	< 0.010	< 0.010
1,2,4-Trichlorobenzene	g/m³	-	< 0.005	-	< 0.005	< 0.005
Other compounds in SVOC Water Samples by GC-MS						
Benzyl alcohol	g/m³	-	< 0.05	-	< 0.05	< 0.05
Carbazole	g/m³	-	< 0.005	-	< 0.005	< 0.005
Dibenzofuran	g/m³	-	< 0.005	-	< 0.005	< 0.005
Isophorone	g/m³	-	< 0.005	-	< 0.005	< 0.005
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	-	0.62	-	< 0.10	< 0.10
C10 - C14	g/m³	-	1.1	-	< 0.2	< 0.2
C15 - C36	g/m³	-	< 0.4	-	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	-	1.8	-	< 0.7	< 0.7

Sample Name:		BH10_01 26-Sep-2024 4:00 pm
Lab Number:		3680726.6
Individual Tests		
Total Suspended Solids	g/m³	480
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn		
Dissolved Arsenic	g/m³	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005
Dissolved Chromium	g/m³	< 0.0005
Dissolved Copper	g/m³	< 0.0005
Dissolved Lead	g/m³	< 0.00010
Dissolved Nickel	g/m³	0.0013
Dissolved Zinc	g/m³	0.0115

3680726.2
BH14_01 26-Sep-2024 11:50 am
Client Chromatogram for TPH by FID



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: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) : Online Edition.	3 g/m^3	1-3, 5-6
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1-6
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m^3	1-6
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m^3	1-2, 4-5
Semivolatile Organic Compounds Screening in Water by GC-MS	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.003 - 0.10 g/m^3	2, 4-5
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m^3	2, 4-5
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m^3	2, 4-5
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m^3	2, 4-5
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m^3	2, 4-5

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

Testing was completed between 01-Oct-2024 and 04-Oct-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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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3683704	SPv1
Contact:	Tiana Hill	**Date Received:**	01-Oct-2024	
	C/- Aurecon New Zealand Limited	**Date Reported:**	07-Oct-2024	
	PO Box 9762	**Quote No:**	126272	
	Newmarket	**Order No:**		
	Auckland 1149	**Client Reference:**	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Aqueous

Sample Name:		BH17_01 30-Sep-2024	BH25_01 30-Sep-2024	BH38_01 30-Sep-2024	BH36_01 30-Sep-2024
Lab Number:		3683704.1	3683704.2	3683704.3	3683704.4
Individual Tests					
Total Suspended Solids	g/m³	30	36	2,700	15,100
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn					
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	0.0005	0.0006	0.0024	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	< 0.0005	0.0017	0.0096	0.0055
Dissolved Zinc	g/m³	0.0024	0.0098	0.0135	0.023
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq					
Acenaphthene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m³	-	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m³	-	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m³	-	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m³	-	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m³	-	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water					
C7 - C9	g/m³	-	-	< 0.10	< 0.10
C10 - C14	g/m³	-	-	< 0.2	< 0.2
C15 - C36	g/m³	-	-	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	-	-	< 0.7	< 0.7

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: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) : Online Edition.	3 g/m^3	1-4
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1-4
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m^3	1-4
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m^3	2-4
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m^3	3-4
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m^3	3-4
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m^3	3-4
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m^3	3-4

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

Testing was completed between 02-Oct-2024 and 07-Oct-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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Client Services Manager - Environmental

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Certificate of Analysis

Client:	Aurecon New Zealand Limited	**Lab No:**	3690956	SPv1
Contact:	Hannah Sussex C/- Aurecon New Zealand Limited PO Box 9762 Newmarket Auckland 1149	**Date Received:**	10-Oct-2024	
		Date Reported:	17-Oct-2024	
		Quote No:	126272	
		Order No:		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled 10/10/24	
		Submitted By:	Hannah Sussex	

Sample Type: Aqueous

Sample Name:		BH14-01 10-Oct-2024	BH14A-02 10-Oct-2024	BH14B-03 10-Oct-2024	BH14C-04 10-Oct-2024	BH39-01 10-Oct-2024
Lab Number:		3690956.1	3690956.2	3690956.3	3690956.4	3690956.5
Individual Tests						
Total Suspended Solids	g/m³	7,100	3,100	< 3	< 3	123
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m³	0.0021	0.0019	< 0.0005	< 0.0005	0.0008
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	0.0007	0.0010	< 0.0005	< 0.0005	0.0045
Dissolved Zinc	g/m³	0.0034	0.0043	< 0.0010	< 0.0010	0.0097
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq						
Acenaphthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m³	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Haloethers in SVOC Water Samples by GC-MS						
Bis(2-chloroethoxy) methane	g/m³	< 0.005	-	-	-	< 0.005
Bis(2-chloroethyl)ether	g/m³	< 0.005	-	-	-	< 0.005
Bis(2-chloroisopropyl)ether	g/m³	< 0.005	-	-	-	< 0.005
4-Bromophenyl phenyl ether	g/m³	< 0.005	-	-	-	< 0.005
4-Chlorophenyl phenyl ether	g/m³	< 0.005	-	-	-	< 0.005

Sample Type: Aqueous						
Sample Name:		BH14-01 10-Oct-2024	BH14A-02 10-Oct-2024	BH14B-03 10-Oct-2024	BH14C-04 10-Oct-2024	BH39-01 10-Oct-2024
Lab Number:		3690956.1	3690956.2	3690956.3	3690956.4	3690956.5
Nitrogen containing compounds in SVOC Water Samples by GC-MS*						
2,4-Dinitrotoluene	g/m³	< 0.010	-	-	-	< 0.010
2,6-Dinitrotoluene	g/m³	< 0.010	-	-	-	< 0.010
Nitrobenzene	g/m³	< 0.005	-	-	-	< 0.005
N-Nitrosodi-n-propylamine	g/m³	< 0.010	-	-	-	< 0.010
N-Nitrosodiphenylamine + Diphenylamine*	g/m³	< 0.010	-	-	-	< 0.010
Organochlorine Pesticides in SVOC Water Samples by GC-MS						
Aldrin	g/m³	< 0.005	-	-	-	< 0.005
alpha-BHC	g/m³	< 0.005	-	-	-	< 0.005
beta-BHC	g/m³	< 0.005	-	-	-	< 0.005
delta-BHC	g/m³	< 0.005	-	-	-	< 0.005
gamma-BHC (Lindane)	g/m³	< 0.005	-	-	-	< 0.005
4,4'-DDD	g/m³	< 0.005	-	-	-	< 0.005
4,4'-DDE	g/m³	< 0.005	-	-	-	< 0.005
4,4'-DDT	g/m³	< 0.010	-	-	-	< 0.010
Dieldrin	g/m³	< 0.005	-	-	-	< 0.005
Endosulfan I	g/m³	< 0.010	-	-	-	< 0.010
Endosulfan II	g/m³	< 0.010	-	-	-	< 0.010
Endosulfan sulphate	g/m³	< 0.010	-	-	-	< 0.010
Endrin	g/m³	< 0.010	-	-	-	< 0.010
Endrin ketone	g/m³	< 0.010	-	-	-	< 0.010
Heptachlor	g/m³	< 0.005	-	-	-	< 0.005
Heptachlor epoxide	g/m³	< 0.005	-	-	-	< 0.005
Hexachlorobenzene	g/m³	< 0.005	-	-	-	< 0.005
Polycyclic Aromatic Hydrocarbons in SVOC Water Samples by GC-MS						
Acenaphthene	g/m³	< 0.003	-	-	-	< 0.003
Acenaphthylene	g/m³	< 0.003	-	-	-	< 0.003
Anthracene	g/m³	< 0.003	-	-	-	< 0.003
Benzo[a]anthracene	g/m³	< 0.003	-	-	-	< 0.003
Benzo[a]pyrene (BAP)	g/m³	< 0.003	-	-	-	< 0.003
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.003	-	-	-	< 0.003
Benzo[g,h,i]perylene	g/m³	< 0.003	-	-	-	< 0.003
Benzo[k]fluoranthene	g/m³	< 0.003	-	-	-	< 0.003
1&2-Chloronaphthalene	g/m³	< 0.003	-	-	-	< 0.003
Chrysene	g/m³	< 0.003	-	-	-	< 0.003
Dibenzo[a,h]anthracene	g/m³	< 0.003	-	-	-	< 0.003
Fluoranthene	g/m³	< 0.003	-	-	-	< 0.003
Fluorene	g/m³	< 0.003	-	-	-	< 0.003
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.003	-	-	-	< 0.003
2-Methylnaphthalene	g/m³	< 0.003	-	-	-	< 0.003
Naphthalene	g/m³	< 0.003	-	-	-	< 0.003
Phenanthrene	g/m³	< 0.003	-	-	-	< 0.003
Pyrene	g/m³	< 0.003	-	-	-	< 0.003
Phenols in SVOC Water Samples by GC-MS						
4-Chloro-3-methylphenol	g/m³	< 0.010	-	-	-	< 0.010
2-Chlorophenol	g/m³	< 0.005	-	-	-	< 0.005
2,4-Dichlorophenol	g/m³	< 0.005	-	-	-	< 0.005
2,4-Dimethylphenol	g/m³	< 0.005	-	-	-	< 0.005
3 & 4-Methylphenol (m- + p-cresol)	g/m³	< 0.010	-	-	-	< 0.010
2-Methylphenol (o-Cresol)	g/m³	< 0.005	-	-	-	< 0.005
2-Nitrophenol	g/m³	< 0.010	-	-	-	< 0.010
Pentachlorophenol (PCP)	g/m³	< 0.10	-	-	-	< 0.10
Phenol	g/m³	< 0.010	-	-	-	< 0.010
2,4,5-Trichlorophenol	g/m³	< 0.010	-	-	-	< 0.010

Sample Type: Aqueous						
Sample Name:		BH14-01 10-Oct-2024	BH14A-02 10-Oct-2024	BH14B-03 10-Oct-2024	BH14C-04 10-Oct-2024	BH39-01 10-Oct-2024
Lab Number:		3690956.1	3690956.2	3690956.3	3690956.4	3690956.5
Phenols in SVOC Water Samples by GC-MS						
2,4,6-Trichlorophenol	g/m³	< 0.010	-	-	-	< 0.010
Plasticisers in SVOC Water Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	g/m³	< 0.03	-	-	-	< 0.03
Butylbenzylphthalate	g/m³	< 0.010	-	-	-	< 0.010
Di(2-ethylhexyl)adipate	g/m³	< 0.005	-	-	-	< 0.005
Diethylphthalate	g/m³	< 0.010	-	-	-	< 0.010
Dimethylphthalate	g/m³	< 0.010	-	-	-	< 0.010
Di-n-butylphthalate	g/m³	< 0.010	-	-	-	< 0.010
Di-n-octylphthalate	g/m³	< 0.010	-	-	-	< 0.010
Other Halogenated compounds in SVOC Water Samples by GC-MS						
1,2-Dichlorobenzene	g/m³	< 0.010	-	-	-	< 0.010
1,3-Dichlorobenzene	g/m³	< 0.010	-	-	-	< 0.010
1,4-Dichlorobenzene	g/m³	< 0.010	-	-	-	< 0.010
Hexachlorobutadiene	g/m³	< 0.010	-	-	-	< 0.010
Hexachloroethane	g/m³	< 0.010	-	-	-	< 0.010
1,2,4-Trichlorobenzene	g/m³	< 0.005	-	-	-	< 0.005
Other compounds in SVOC Water Samples by GC-MS						
Benzyl alcohol	g/m³	< 0.05	-	-	-	< 0.05
Carbazole	g/m³	< 0.005	-	-	-	< 0.005
Dibenzofuran	g/m³	< 0.005	-	-	-	< 0.005
Isophorone	g/m³	< 0.005	-	-	-	< 0.005
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	< 0.10	-	-	-	< 0.10
C10 - C14	g/m³	< 0.2	-	-	-	< 0.2
C15 - C36	g/m³	< 0.4	-	-	-	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	-	-	-	< 0.7

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: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) : Online Edition.	3 g/m³	1-5
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1-5
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m³	1-5
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m³	1-5
Semivolatile Organic Compounds Screening in Water by GC-MS	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.003 - 0.10 g/m³	1, 5
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m³	1, 5
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m³	1, 5
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m³	1, 5
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m³	1, 5

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

Testing was completed between 12-Oct-2024 and 16-Oct-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)
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