



Detailed Site Investigation (Contamination)

WIAL Sea Defences Renewal Project - Miramar Golf Course

Prepared for Wellington International Airport Limited

Prepared by Beca Limited

27 January 2026



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Revision History

Revision N°	Prepared By	Description	Date
0	Mio Akiyama & Tyler Neve	Draft	4 September 2025
1	Tyler Neve	Updated Draft following project team review and additional analytical results included.	27 January 2026

Document Acceptance

Action	Name	Signed	Date
Prepared by	Mio Akiyama Tyler Neve (Certified Environmental Practitioner, General)		27 January 2026
Reviewed by	Sarah Shepherd (Suitably Qualified and Experienced Practitioner)		27 January 2026
Approved by	Jennifer Hart		27 January 2026
on behalf of	Beca Limited		

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Code of Conduct, Qualifications and Experience

Preparation and review of this report / Environment Court Code of Conduct

This report has been prepared by Mio Akiyama and Tyler Neve. Mio is an Environmental Scientist with three years of experience in conducting contaminated land investigations.

Tyler has over 10 years of experience in contaminated site investigations in New Zealand. Tyler holds a Bachelor of Science from Victoria University of Wellington and is a Certified Environmental Practitioner.

The report has been reviewed by Sarah Shepherd. Sarah is a suitably qualified and experienced practitioner (SQEP) with over 20 years of experience managing and delivering a wide variety of environmental investigation works in New Zealand, Asia and the United Kingdom. She is experienced in regulatory compliance, oversight of environmental investigations, monitoring and risk assessment, contractor management, preparation and review of technical reports, as well as consultation with stakeholders and regulatory bodies. Sarah holds a Bachelor of Technology (Hons) Environmental Engineering from Massey University and has been a Certified Environmental Practitioner Site Contamination Specialist since 2016.



Mio Akiyama, Tyler Neve, and Sarah Shepherd, have the qualifications and expertise set out above and confirm that we have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. This report has been prepared in compliance with that Code, as if it was expert evidence presented in proceedings before the Environment Court. Unless stated otherwise, this report is within our area of expertise, and we have not omitted to consider material facts known to us that might alter or detract from the opinions expressed in this report.

Glossary

Table 1. Glossary of terms (alphabetical)

Term	Definition
ADO	Automotive diesel oil
ANZG	Australian and New Zealand Guidelines for Fresh & Marine Water Quality
ASL	Above sea level
ASLP	Australian Standard Leaching Procedure
AST	Above-ground storage tank
Bgl	Below ground level
ESCP	Erosion and sediment control plan
CLMG	Contaminated Land Management Guidelines
COC	Chain of custody
CSM	Conceptual site model
CLMP	Contaminated land management plan
DAF	Dilution and attenuation factor
DGV	Default guideline value
DSI	Detailed site investigation
Eco-SGV	Ecological soil guideline value
GWRC	Greater Wellington Regional Council
HAIL	Hazardous Activities and Industries List
HEPA	Heads of EPA Australia and New Zealand
LOR	Limit of Reporting
L	Litre
MfE	Ministry for the Environment
MGC	Miramar Golf Course
NEMP	PFAS National Environmental Management Plan (Version 3)
NESCS	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
NRP	Natural Resources Plan
OCP	Organochlorine pesticides
RPD	Relative percentage difference
PAH	Polycyclic aromatic hydrocarbons
PFAS	Per- and polyfluoroalkyl substances
PFHxS	Perfluorohexanesulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
PSI	Preliminary site investigation
QA/QC	Quality assurance / quality control
SLUR	Selected Land Use Register
SPLP	Synthetic precipitation leachate procedure

Term	Definition
SQEP	Suitably Qualified and Experienced Practitioner
SVOC	Semi-volatile organic compounds
TCLP	Toxicity characteristic leachate procedure
USEPA	United States Environmental Protection Agency
WAC	Waste acceptance criteria
WCC	Wellington City Council
WIAL	Wellington International Airport Limited
WWTP	Wastewater treatment plant

Executive Summary

Beca Limited (Beca) has been commissioned by Wellington International Airport Limited (WIAL) to undertake a Detailed Site Investigation (DSI) of the southern end of the Miramar Golf Course (MGC) at 28 Stewart Duff Drive, Miramar, Wellington 6022 (the 'site'). It is proposed to use a 4.5 hectare area in the southern part of the former MGC as a laydown yard (i.e. the MGC Yard) for the Southern Seawall Renewal Project (the Project).

Beca prepared a Preliminary Site Investigation (PSI) for the Project, which identified activities within and adjacent to the site that are included on the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL). The PSI recommended a DSI be undertaken to assess potential risks to human health and the environment and to inform any resource consent requirements associated with potentially contaminated soils at the site.

A total of 132 soil samples were collected from 53 locations in May and July 2025, plus six duplicates. 39 individual and composite soil samples plus duplicates were analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc). A total of 19 individual and composite soil samples were analysed for a combination of polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), organochlorine pesticides (OCPs). 50 individual and composite samples were analysed for per- and polyfluoroalkyl substances (PFAS).

Results

In summary:

- Heavy metals, OCPs, and PAHs were not detected at concentrations that exceeded human health or environmental criteria. Some heavy metals were present above published background concentrations, and dichlorodiphenyltrichloroethane (DDT) was detected in surface soil from two locations.
- PFAS were detected in soil up to 1 metre below ground level (the maximum depth tested) in the western part of the site that appears to correspond with the historical National Airways Corporation (NAC) apron and the immediately surrounding area. The PFAS concentrations complied with human health, and direct terrestrial ecological criteria.
- Synthetic precipitation leachate procedure (SPLP) was completed on samples from six locations with leachate analysed for PFAS. The detected concentrations of PFAS, specifically perfluorooctane sulfonic acid (PFOS), complied with water quality guidelines with a dilution attenuation factor applied representing dilution and attenuation of concentrations in pore water upon discharge to groundwater and groundwater discharging to surface water.

Conclusions

The following conclusions were made based on the analytical results:

- At the concentrations encountered, exposure pathways for human receptors and terrestrial ecological receptors are considered incomplete.
- Soils in the western part of the site that historically contained the NAC apron contain PFOS concentrations above the conservative ecological indirect exposure criteria. This criterion is not considered relevant while the area is used as a yard and covered by a compacted surface. If areas are to be restored to ecological habitat it will require importing of topsoil to allow for planting and a cover of 30 cm should be maintained.
- WIAL hold a consent from Wellington City Council (WCC) under Regulation 11 of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS), Rule 11.2.4 and Rule 32.2.1 of the Operative District

Plan to undertake disturbance of contaminated land associated with the operation and maintenance of Wellington International Airport (SR520690).

- The WIAL site-wide Contaminated Land Management Plan (CLMP) encompasses the MGC. The site is classed as a 'Higher Risk' area in the CLMP given at the time of writing the CLMP no sampling had been undertaken within the area. Based on the results of this DSI the site would meet the definition of a 'medium risk' area.
- Discharges associated with soil disturbance at the site for the project should not require consent under rules R82 and R83 of the Greater Wellington Regional Council Natural Resources Plan (GWRC NRP) as the leachate results indicate that contaminant concentrations are not likely to pose an unacceptable risk to the receiving environment.
- The potential for discharge of contaminants from soil within the site during the soil disturbance works can be readily managed via standard erosion and sediment control measures.
- Excess spoil from outside of the PFAS impacted area is suitable for reuse or disposal as cleanfill.

Recommendations

Based on the findings, the following recommendations are made:

- Based on the results of this DSI the site would meet the definition of a 'medium risk' area in the site-wide CLMP. The CLMP which includes procedures for handling / management of spoil, and unexpected discoveries should be referred to throughout site development / soil disturbance works.
- Consideration on the fate of the PFAS impacted soil is required (i.e. offsite disposal vs retention on site). If off-site disposal of excess spoil which contains PFAS is required, an application should be made for the material to be accepted by Silverstream Landfill or another appropriately licensed facility, prior to disturbance of that soil.
- The Erosion and Sediment Control Plan (ESCP) prepared for works should include provisions for working with PFAS-impacted soil.

1 Introduction

Beca Limited (Beca) has been commissioned by Wellington International Airport Limited (WIAL) to undertake a Detailed Site Investigation (DSI) for the southern end of the Miramar Golf Course (MGC) at 28 Stewart Duff Drive, Miramar, Wellington 6022 (the 'site').

Beca has previously prepared a Preliminary Site Investigation (PSI)¹ for the project which included the site, and should be read in conjunction with this DSI. A summary of the PSI is included in **Section 4** of this report. The PSI encompassed a larger project area. Soil sampling completed in the other areas outside of the MGC have been reported in separate DSI reports.

1.1 Resource Consent Considerations

The site is included in the site-wide resource consent (SR520690) held by WIAL to '*undertake disturbance of contaminated land associated with the operation and maintenance of Wellington International Airport*' and the supporting site-wide Contaminated Land Management Plan (CLMP)². Condition (a) of the consent requires that any soil disturbance works must be undertaken in accordance with the CLMP.

As per the CLMP, soil sampling is required prior to soil disturbance works in 'medium risk' and 'higher risk' areas. The site is classed as a 'higher risk' area in the CLMP and therefore requires soil sampling prior to works.

1.2 Purpose

The PSI identified activities within and adjacent to the site that are included on the Ministry for the Environment (MfE) Hazardous Activities and Industries List (HAIL) and recommended a DSI be undertaken to assess presence of contaminants in soil.

The purpose of the investigation was to:

- Inform the conceptual site model (CSM) and assess potential risks to human health and the environment.
- Assess potential spoil disposal and management options.
- Provide an assessment of the works against site-wide resource consent SR520690 issued under:
 - Regulation 11 of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS),
 - Rule 11.2.4 and Rule 32.2.1 of the Operative District Plan
- Provide an assessment of the works against the contaminated land rules of the Greater Wellington Regional Council (GWRC) Natural Resources Plan (NRP)

1.3 Scope

The scope of the DSI included:

- Preparation of health and safety documentation.
- Excavation of 43 hand augers to a maximum depth of 0.3 m below ground level (bgl) and 10 machine excavated test pits to a maximum depth of 1 m bgl.
- Collection of 129 soil samples.
- Analysis of selected soil samples, including composite samples, for a combination of:
 - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc),

¹ Beca, 13 February 2025. Preliminary Site Investigation (Contamination) – Sea Defences Renewal.

² WIAL, 31 March 2023. Wellington International Airport Site-Wide Contaminated Land Management Plan.

- Total petroleum hydrocarbons (TPH),
- Organochlorine pesticides (OCP),
- Polycyclic aromatic hydrocarbons (PAH), and
- Per- and poly-fluoroalkyl substances (PFAS).
- Analysis of leachate from select samples for synthetic precipitation leachate procedure (SPLP) and toxicity characteristic leachate procedure (TCLP) to assist with assessing suitability for the on-site reuse of soils and disposal options.
- Preparation of this DSI report.

The assessment was undertaken and reported in general accordance with:

- MfE Contaminated Land Management Guidelines (CLMG) No. 1 – Reporting on Contaminated Sites in New Zealand (2021).
- MfE CLMG No. 5 – Site Investigation and Analysis (2021).
- Heads of EPA Australia and New Zealand (HEPA), 2025. PFAS National Environmental Management Plan (NEMP) Version 3.0.

1.4 Proposed Works

Proposed works include enabling works to create a laydown yard (i.e. the MGC Yard) on a 4.5 ha area in the southern part of the former MGC. This will include:

- Vegetation clearance and topsoil removal,
- Cut and fill to form the site yard
- Paving of yard access roads, construction of unbound/granular pavements for laydown areas.

The civil drawings (at detailed design) are provided in **Appendix A**.

2 Site Description

2.1 Site Identification

Specific identifiers for the site are listed in Table 1, and the site location is shown in **Figure 1** and **Figure 2**. **Figure 2** also shows the area covered by the site-wide CLMP.

Table 1. Site Identification

Parameter	Description
Address	28 Stewart Duff Drive, Rongotai, Wellington 6012
Legal description	Lot 1 Deposited Plan 552938
Approximate coordinates (NZGD 2000, centre of site)	-41.3346241, 174.8119766
Ownership	WIAL
Approximate area	45,000 m ²



Figure 1. Site extent (red polygon) (Source: ArcGIS)



Figure 2. Site location (red polygon) within WIAL site boundary (black polygon) (Source: ArcGIS)

3 Environmental Setting

3.1 Current Land Uses

The site was formerly part of the MGC and is overlain by grass with intermittent bunkers. An artificial pond is located on the northern section of the site. There is a small former water treatment plant building to the south of the pond which formerly contained a filter treatment and ultra-violet treatment plant. These features are shown in **Figure 1**. Between 1995 and 2019, reclaimed water from the Moa Point wastewater treatment plant (WWTP) discharge was pumped to the treatment plant building, treated, and stored in the pond. This was then used to irrigate the golf course. As the resource consent for the discharge of the treated reclaimed water has expired, potable municipal supply is now used to supply the pond. The pond has an approximately three million litre (L) storage capacity.

3.2 Surrounding Land Uses

A new carparking facility at Wellington Airport is located directly to the north of the site, as well as a portion of disused golf course which is earmarked for future development. Beyond this is the active portion of the MGC which continues to be used as a golf course.

The Wellington Sludge Minimisation Facility (SMF) and WWTP are 30 m south of the site. A residential area is located approximately 130 m east and south-east on Raukawa Street and Kekerenga Street respectively. Wellington Airport is directly across Stewart Duff Drive to the west.

3.3 Topography

The site is undulating and ranges from 1 m to 20 m above sea level (asl).³

3.4 Geology and Hydrogeology

According to GNS⁴, the geology underlying the site comprises:

- Holocene shoreline deposits described as ‘beach deposits consisting of marine gravel with sand, mud, and beach ridges’ on the northern section of the site and,
- Basement (Eastern Province) sedimentary rocks described as ‘alternating sandstone and mudstone, poorly bedded sandstone with minor coloured mudstone, conglomerate, basalt, chert’ on the southern section of the site.

Based on a site-wide PSI completed by GHD for the airport⁵, seven bores were located within 500 m of the golf course site and were for either groundwater monitoring or construction. No bores were identified as being for potable water or industrial supply.

Temporary groundwater monitoring wells were installed by GHD approximately 20 m to the north⁶ of the site associated with the construction of the carpark. Fieldnotes provided by GHD indicated that groundwater was measured between 0.57 and 1 m bgl in the temporary monitoring wells on 6 June 2024.

³ Wellington City Council GIS WebMap Viewer

⁴ <https://data.gns.cri.nz/geology/>

⁵ GHD, 2018. Wellington International Airport Preliminary Site Investigation (Site-wide).

⁶ GHD Limited, July 2024. WIAL Uncovered Car Park Assessment of Dewatering Effects

The GHD assessment also noted that the geology of the site suggests an unconfined sandy aquifer, above greywacke rock. Unconfined groundwater typically follows topography, and the conceptual understanding of the site is that the inferred groundwater flow is towards Lyall Bay (east to west).

3.5 Surface water and Drainage

There is a partially culverted watercourse 600 m north of the site within the MGC. It is understood that surface water north of the site drains to the watercourse. Surface water across the site drains primarily into the pond. Surface water on the western boundary drains into the storm water network at the airport.

3.6 Sensitive Receptors

Lyall Bay is 270 m south and 500 m west of the site. There are no known abstraction wells for potable water in the area. The land directly east of the site is residential (Raukawa Street) but it is noted this elevated above the site (topographically and hydraulically upgradient). WIAL has indicated that there is a wetland 40 m north of the site. According to the ecological assessment completed in 2023⁷:

*“Wetland assessment area WP-01 was a small area of ponding to the north of the irrigation pond in the southern half of the golf course, with a patch of giant rush (*Juncus pallidus*) bordered by Edgar's rush (*Juncus edgariae*) in its western corner. Due to the vegetation and hydrology, this area was assessed as wetland under the NPS-FM (2020) ... An ecological context score of low has been assigned to the wetland due to the low likelihood of the wetland contributing meaningfully to broader ecological processes.*

Earthworks and land disturbance activities ... may result in sedimentation to the wetland and has the potential to result in the loss of extent and/or values of the identified wetland. However, due to the poor ecological condition of these wetland areas, the overall level of effects from these activities has been assessed as negligible.”

⁷ PDP Ltd, May 2023. Ecological Impact Assessment – Miramar Golf Club.

4 Summary of Preliminary Site Investigation

4.1 Summary of Historical Information

The Miramar Golf Club was established in 1908. The golf course has been through numerous reconfigurations overtime, with it being in the layout at the time of the PSI since the 1995 reconfiguration. Various agrichemicals have been used on the course to maintain the greens, including endosulfans, organophosphates, and carbamates. The GHD PSI also indicated the sporadic use of pesticides of fairways.

Historically, treated wastewater from the Moa Point WWTP was further treated at the golf course prior to storage in the pond for irrigation. Applying waste to land is considered a HAIL activity (*G5 – Waste disposal to land*). The pond was constructed in 1995 and the discharge consent to apply treated wastewater to land, was surrendered in 2019.

Previous investigations⁸ on the wider golf course identified heavy metals and OCP above background concentrations in selected soil samples. PFAS were identified in shallow soil in one low-lying location 260 m north of the present site. The detection was isolated to one location and only in surficial soils. The presence of PFAS was attributed by GHD to historical use of wastewater for irrigation, combined with the low-lying position of this sample location⁹.

A part of the historical National Airways Corporation (NAC) hangar apron overlapped with the west side of the site between approximately 1961 and 1988. The overlapping area appeared to contain above ground storage fuel tanks (AST). Site plans relating to a proposed parking development at the Wellington Airport (dated 1967) showed the location of the NAC hangar apron.

The following HAIL codes were considered to apply to the site at a ‘more likely than not’ level of certainty:

- **A10** – Persistent pesticide bulk storage or use, including sports turfs. Due to the use of pesticides on the greens, tee boxes, and disposal of leftover agrichemicals onto the fairways.
- **G5** – Waste disposal to land. Due to irrigation of wastewater onto the golf course.
- **F1** – Airports, including fuel storage, workshops, washdown areas, or fire practice areas. Relating to the historical NAC apron.

4.2 Additional Information since the PSI

Additional information and investigations have been received / sourced since the PSI was issued, and have been summarised here.

4.2.1 NAC site plans

Additional NAC site plans dated between 1973 and 1975 were located and are provided in **Appendix B**. The site plans show that the following was on the east perimeter of the apron:

- A dangerous goods store on the north-east corner of the apron.
- A 10,000 L methanol AST in a concrete block compound.
- A BP 96 and Mobil automotive diesel oil (ADO) underground storage tanks (USTs) on the east perimeter of the apron.
- A workshop on the north perimeter of the apron.
- Three 10,000 L USTs adjacent to the workshop and a kerbside pump (BP 83, BP 96 and Mobil ADO).

⁸ Pattle Delamore Partners Ltd (2023) Miramar Golf Club Incorporated - Miramar Golf Club – Detailed Site Investigation

⁹ GHD Ltd (2020) Miramar Golf Course Detailed Site Investigation

4.2.2 Miramar Golf Course Preliminary Site Investigation, March 2020

A PSI¹⁰ specific to the southern end of the golf course was completed by GHD in 2020 to support a subdivision. The PSI was a summary of the information provided in the original wider golf course PSI. The PSI concluded that subdividing the golf course and keeping the use as a golf course was unlikely to pose a risk to human health.

However, it was recommended that, if a change in land use is undertaken at the site in the future a DSI under the guidance of a SQEP, and in accordance with CLMG No. 1 and CLMG No. 5, be undertaken prior to the change in land use in order to investigate the potential risk to human health. According to the PSI, the change in land use on the site was likely to be considered either as a Controlled Activity (if the DSI confirmed soil contamination does not exceed the applicable standard) or as a restricted discretionary activity under the NESCS.

4.2.3 WIAL Uncovered Car Park Assessment of Dewatering Effects, July 2024

A dewatering effects assessment¹¹ was completed by GHD to support a resource consent for dewatering and operational stormwater activities expected during the car park development.

Two piezometers were installed in 2024 approximately 70 m north of the pond on site (**Figure 3**). Groundwater quality samples were collected from one piezometer on 31 May and 1 June. Only one piezometer was sampled as the other became dry and would not recover. Samples contained low levels of PFAS in both samples collected, at 0.0079-0.0098 µg/L perfluorooctanesulfonic acid (PFOS), 0.007-0.0079 perfluorohexanesulfonic acid (PFHxS), and 0.00047-0.00070 µg/L perfluorooctanoic acid (PFOA). Concentrations were below the 95% species protection levels for aquatic ecosystems and below drinking water standards. It is understood that the piezometers have been removed.

Information obtained from GHD indicated that groundwater was in the order of 1.5 m bgl, and that groundwater flow direction from the golf course is westerly, towards Lyall Bay.

¹⁰ GHD Limited, March 2020. Miramar Golf Course Preliminary Site Investigation.

¹¹ GHD, 5 July 2024. WIAL Uncovered Car Park – Assessment of Dewatering Effects.



Figure 1. Piezometer locations

4.2.4 Miramar Golf Course Detailed Site Investigation, April 2023

According to a DSI prepared by Pattle Delamore and Partners Ltd (PDP) in 2023¹², the initial 1909 golf course layout consisted of 11-holes and by the early 1990s the course consisted of 18-holes. In 1995 the reconfiguration of the 18-hole golf course was completed. Site drawings and plans provided in the DSI appendices show that the golf course configurations including the locations of the greens have varied and been shifted across the decades.

A total of 124 soil samples were collected from across the northern third of the golf course (north of the site). In summary:

- Anthropogenic materials were not encountered in any of the investigation locations.
- Almost all of the heavy metals results were at the expected background concentrations for the area.
- No OCPs other than DDT isomers and endosulfan sulphate were detected in any of the analysed samples. Concentrations of the sum of DDT isomers ranged from <0.010 to 1.01 mg/kg, and endosulfan sulphate was detected in three samples. Concentrations did not exceed human health criteria for recreational land use. Five samples (Composite of HA3_0.1 & HA4_0.0, HA19_0.2, HA27_0.0, HA31_0.0 and 0.2) collected from current or former green/tee areas contained sum of DDT isomers concentrations above the 0.7 mg/kg WasteMINZ cleanfill waste acceptance criteria.

¹² PDP, 14 April 2023. Miramar Golf Club Incorporated – Detailed Site Investigation.

4.3 HAIL Activities and Potential Contaminants of Concern

Table 2 presents a summary of the identified sources of contamination and potential contaminants of concern associated with these activities. The PSI HAIL map is available in **Appendix C**.

Table 2. HAIL activities and potential contaminants of concern

Activity	HAIL Code	Contaminants of Concern
Use of pesticides on the fairways, greens and tees.	A10 – Persistent pesticide bulk storage or use, including sports turfs.	<ul style="list-style-type: none"> • Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) • OCPs
Historical NAC apron with ASTs and USTs.	F1 – Airports, including fuel storage, workshops, washdown areas, or fire practice areas.	<ul style="list-style-type: none"> • Heavy metals • PAH • TPH • PFAS
Irrigation of reclaimed wastewater onto the golf course between 1998 and 2019.	G5 – Waste disposal to land.	<ul style="list-style-type: none"> • Heavy metals • PFAS

4.4 Preliminary Exposure Pathway Assessment

The preliminary CSM (**Table 3**) was developed to describe the relationship between sources of contamination on site, the human and environmental receptors that may be exposed to those contaminants in the context of soil disturbance, and the pathways by which those receptors may be exposed. Potential risk exists where a receptor is exposed to a contaminant by means of a complete exposure pathway. The level of risk is affected by a combination of factors, including (but not limited to) the type of contaminant, the spatial location and distribution (e.g. near-surface or at depth), and the type of pathway (e.g. via dust inhalation, from hand-to-mouth contact).

Table 3. Preliminary CSM

Source	Receptor	Pathway	Pathway Complete?
<ul style="list-style-type: none"> • Heavy metals • OCPs • PFAS • PAH 	Construction workers	Exposure of workers to contaminants in soils and groundwater during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.	<p>Potentially Complete Pathway – Given the diffuse nature of the potential contaminant sources, the contaminants are unlikely to be present at levels that exceed human health criteria for commercial/ industrial workers. Previous investigations within the golf course north of the site have not identified contaminants in excess of human health criteria.</p> <p>Maintenance / excavation workers are not a scenario considered by the NESCS. The Methodology¹³ states it was considered more appropriate that exposure be limited through the site-specific controls that are required under health and safety legislation.</p>

¹³ MfE, 2011. Methodology for Deriving Standard for Contaminants in Soil to Protect Human Health.

Source	Receptor	Pathway	Pathway Complete?
	Future site users	Exposure of future site users to contaminants in soils – dermal contact, ingestion or inhalation of dust/vapour.	<p>Incomplete Pathway – Based on the potential contaminants of concern and contamination sources, it is likely contaminants will be primarily in the topsoil, which is to be removed and stockpiled.</p> <p>It is understood that the yard will be covered by a layer of hardfill therefore mitigating any potential risk of exposure.</p>
	Groundwater resources for public consumption	Leaching and migration of soil contaminants into groundwater.	<p>Incomplete Pathway – There are no registered potable groundwater bores in proximity to the site, and the site is not within a source protection zone.</p>
	Terrestrial ecological receptors	Exposure of existing and future terrestrial ecological receptors to contaminants via dermal contact, ingestion, or inhalation of dust/vapour.	<p>Potentially Complete Pathway - Based on the potential contaminants of concern and contamination sources, contaminants (namely PFAS) may be present at concentrations exceeding direct or indirect exposure criteria for terrestrial receptors.</p> <p>For future terrestrial receptors, this potentially complete pathway is limited to areas that remain unsealed.</p>
	Surface water	Sediment and runoff directly into surface water discharging into Lyall Bay.	<p>Potentially Complete Pathway – The nearest surface water body is the artificial pond on the north section of the site. The pond was historically used for irrigation across the golf course but is no longer used.</p> <p>It is understood that stormwater on the west side of the golf course drains to the airport stormwater network.</p> <p>Soil disturbance will be subject to standard erosion sediment controls preventing discharge to the pond and irrigation system.</p>
		Migration of soil contaminants into surface water through shallow groundwater discharging into Lyall Bay.	<p>Potentially Incomplete Pathway – The onsite man-made pond is lined with high-density polyethylene. The groundwater was encountered at 1.36 m to 1.5 m bgl in test pits in the golf course north of the site, and measured as shallow as 0.57 m bgl in temporary monitoring wells. Shallow groundwater is inferred to flow in a westerly towards Lyall Bay.</p>

5 Site Investigation Scope and Rationale

5.1 Potential Contaminants of Concern

Potential contaminants of concern were selected based on activities identified in the PSI. The following analytical suite was sampled for:

- Heavy metals
- PAH
- TPH
- PFAS
- OCPs.

5.2 Investigation Rationale

The intrusive investigation was completed via hand-dug pits and machine excavated test pits. The following rationale was applied:

- 38 hand dug test pits were advanced to a maximum depth of 0.3 m bgl and were sampled from the surface (0.0 m bgl) and at 0.3 m bgl from the following areas:
 - Eight samples from tee boxes,
 - Nine samples from greens,
 - 12 samples from fairways,
 - Nine samples from remaining areas.
- Hand excavation locations were distributed to target various elements of the golf course (i.e., tee boxes, greens, fairways and all other areas).
- Five hand pits were hand dug along the 'ridge' to the south-east of the golf course to a maximum depth of 0.3 m bgl to determine disposal and/or reuse requirements for soils that may be disturbed in this area.
- Selected soil samples collected from the same tee boxes, greens, and fairways were composited at the laboratory prior to analysis. This approach was adopted because contaminants commonly associated with golf course maintenance, such as metals and pesticides, are typically distributed in a widespread and relatively uniform manner across these distinct playing surfaces due to consistent management practices.
- Selected samples were analysed for PAH following observations of fill material (darker silty soils) at depth in the western portion of the site, and broadly corresponds with the former apron area.

Following receipt of initial sampling results, further test pitting in the areas where PFAS was detected was undertaken to delineate the extent of the PFAS impacted soil. The following was undertaken as part of the PFAS delineation investigation:

- Ten test pits were machine excavated to a maximum depth of 1.0 m bgl and were sampled from the surface, 0.3, 0.5 and 1.0 m bgl.

5.3 Soil Sampling Methodology

The initial investigation was carried out on 7 and 8 May 2025 by two Beca Environmental Scientists. Conditions were dry, overcast and windy. 38 hand-dug pits were undertaken to a maximum depth of 0.3 m bgl with samples collected from the surface and 0.3 m bgl.

The PFAS delineation phase of the investigation was undertaken across 16 and 17 July 2025. Ten test pits were excavated to a maximum depth of 1 m bgl. Soil samples were collected from the surface, 0.3, 0.5 and 1.0 m bgl in the machine excavated test pits.

A total of 129 samples including two duplicate samples were collected from 53 locations. A sample location plan is presented in **Appendix D**.

A clean pair of nitrile gloves were worn for each sample to prevent cross-contamination. The hand tools were wiped clean with wipes, water and Decon 90, with a final rinse of water between each sample collection. As a contaminant of concern was PFAS, all equipment was rinsed with laboratory-supplied Type 1 water following cleaning. PFAS soil samples were double bagged.

Samples were placed in laboratory-supplied plastic or glass containers and placed into chilly bins with ice prior to being delivered to R. J. Hill Laboratories Limited (Hills) in Wellington. The samples were delivered with Chain of Custody (COC) forms, which detail the required handling and testing instructions. A copy of the COC is available in **Appendix E**, and the Hills analytical reports are available in **Appendix F**.

Details of the samples collected are provided in **Table 4**. Test pit logs are available in **Appendix G**, and images of test pits, hand pits, and general site photography available in **Appendix H**.

Field sampling and sampling management procedures were undertaken in general accordance with:

- MfE Contaminated Land Management Guidelines No. 5 – Site Investigation and Analysis (2021)
- HEPA 2025. PFAS NEMP (Version 3).

Table 4. Sample location summary

Sample Location ID	Northing (NZTM)	Easting (NZTM)	Sample Depths (m bgl)
<i>Hand-excavated locations</i>			
MGC_HA01	5422513.771	1751551.826	• 0.1 and 0.3
MGC_HA02	5422499.045	1751549.711	• 0.1 and 0.3
MGC_HA03_G	5422508.879	1751619.047	• 0.1 and 0.3
MGC_HA04_G	5422501.314	1751605.703	• 0.1 and 0.3
MGC_HA05_G	5422507.572	1751596.538	• 0.1 and 0.3
MGC_HA06_F	5422530.75	1751650.504	• 0.1 and 0.3
MGC_HA07_F	5422529.191	1751670.369	• 0.1 and 0.3
MGC_HA08_F	5422562.885	1751675.061	• 0.1
MGC_HA09_F	5422586.6	1751710.759	• 0.1 and 0.3
MGC_HA10_O	5422486.469	1751661.003	• 0.1 and 0.3
MGC_HA11_O	5422546.317	1751738.927	• 0.1 and 0.3
MGC_HA12_O	5422531.000	1751720.932	• 0.1 and 0.3
MGC_HA13_O	5422574.237	1751767.865	• 0.1 and 0.3
MGC_HA14_O	5422601.701	1751783.809	• 0.1 and 0.3
MGC_HA15_F	5422594.299	1751805.185	• 0.1 and 0.3
MGC_HA16_F	5422595.005	1751820.057	• 0.1 and 0.3
MGC_HA17_F	5422600.711	1751838.025	• 0.1 and 0.3
MGC_HA18_G	5422633.909	1751876.383	• 0.1 and 0.3
MGC_HA19_G	5422649.319	1751868.091	• 0.1 and 0.3
MGC_HA20_G	5422657.203	1751884.087	• 0.1 and 0.3
MGC_HA21_G	5422663.568	1751872.93	• 0.1 and 0.3
MGC_HA22_F	5422684.993	1751867.328	• 0.1 and 0.3
MGC_HA23_F	5422695.562	1751848.242	• 0.1 and 0.3

Sample Location ID	Northing (NZTM)	Easting (NZTM)	Sample Depths (m bgl)
MGC_HA24_F	5422707.349	1751874.307	• 0.1 and 0.3
MGC_HA25_F	5422714.316	1751849.685	• 0.1 and 0.3
MGC_HA26_O	5422747.193	1751864.06	• 0.1 and 0.3
MGC_HA27_O	5422743.189	1751839.073	• 0.1 and 0.3
MGC_HA28_O	5422715.157	1751781.633	• 0.1 and 0.3
MGC_HA29_G	5422725.595	1751773.672	• 0.1 and 0.3
MGC_HA30_O	5422688.369	1751735.942	• 0.1 and 0.3
MGC_HA31_T	5422673.904	1751808.988	• 0.1 and 0.3
MGC_HA32_T	5422651.775	1751785.059	• 0.1 and 0.3
MGC_HA33_O	5422637.155	1751759.562	• 0.1 and 0.3
MGC_HA34	5422665.577	1751726.918	• 0.1 and 0.3
MGC_HA35	5422648.341	1751701.4	• 0.1 and 0.3
MGC_HA36_T	5422620.648	1751681.481	• 0.1 and 0.3
MGC_HA37_T	5422604.453	1751673.587	• 0.1 and 0.3
MGC_HA40	5422608.421	1751885.763	• 0.1 and 0.3
MGC_HA41	5422578.092	1751844.249	• 0.1 and 0.3
MGC_HA42	5422460.328	1751671.704	• 0.1 and 0.3
MGC_HA43	5422522.557	1751751.658	• 0.1 and 0.3
MGC_HA44	5422554.344	1751809.88	• 0.1 and 0.3
<i>Machine-excavated locations</i>			
MGC_TP09	5422518.8990	1751628.3335	• 0.1, 0.3, 0.5 and 1.0
MGC_TP10	5422515.5489	1751653.4032	• 0.1, 0.3, 0.5 and 1.0
MGC_TP11	5422544.1659	1751645.5196	• 0.1, 0.3, 0.5 and 1.0
MGC_TP12	5422538.4434	1751663.6703	• 0.1, 0.3, 0.5 and 1.0
MGC_TP13	5422557.5356	1751659.5998	• 0.1, 0.3, 0.5 and 1.0
MGC_TP14	5422555.3805	1751679.6489	• 0.1, 0.3, 0.4, 0.6 and 1.0
MGC_TP15	5422549.5169	1751695.7832	• 0.1, 0.3, 0.5 and 1.0
MGC_TP16	5422570.3006	1751673.5645	• 0.1, 0.3, 0.5 and 1.0
MGC_TP17	5422571.1518	1751687.5392	• 0.1, 0.3, 0.5 and 1.0
MGC_TP18	5422587.2354	1751662.8879	• 0.1, 0.3, 0.5 and 1.0
MGC_TP20	5422674.2934	1751690.3175	• 0.1, 0.3, 0.5 and 1.0
MGC_QAQC1_070525	-	-	• 0.1
MGC_QAQC2_080525	-	-	• 0.1
MGC_QAQC3_080525	-	-	• 0.1
MGC_QAQC1_160725	-	-	• 0.1
MGC_QAQC2_170725	-	-	• 0.1
MGC_QA1_240325	-	-	• 0.1

5.4 Leachate Analysis Rationale and Methodology

Select samples were scheduled for leachate analysis to assist with assessing risk to the environment and the suitability for the on-site reuse of soils, and disposal options. The PFAS NEMP states the PFAS leachability should be determined by the Australian Standard Leaching Procedure (ASLP) (AS 44339) and should be conducted using both a pH 5 buffered extractant and un-buffered reagent water. ASLP is not available as an accredited test in New Zealand so, in lieu of this, TCLP and SPLP is used, respectively. AsureQuality use an in-house protocol based on United States Environmental Protection Agency (USEPA) 1311 test TCLP conducted with both pH 5 and un-buffered reagent water consistent with the PFAS NEMP.

SPLP is a method designed to simulate the effects of rainfall on contaminants in soil *in situ*. PFAS concentrations in leachate are typically higher with the un-buffered reagent water used in the SPLP as opposed to the pH 5.

Six samples were analysed for PFAS in leachate via SPLP in July 2025.

5.5 Soil Sampling Regulations and Provisions

5.5.1 NESCS Permitted Activity Provisions

Given activities on the HAIL have been undertaken at the site, the NESCS applies with respect to activities including soil sampling. Where soil sampling is undertaken in accordance with Regulation 8(2), the soil sampling for investigation of contaminated land is a permitted activity. In accordance with Regulation 8(2), measures were in place to minimise human exposure to contaminants before, during and after the sampling program and the sampling locations were immediately restored to an erosion resistant state upon completion of the sampling program. No soil was removed from the site except for sample analysis.

5.5.2 GWRC Natural Resources Plan

Rule R81 of the NRP allows for a DSI of contaminated land to be undertaken as permitted activity provided the investigation is undertaken in accordance with CLMG No 1 and 5 and the report is provided to GWRC within two months of completion of the investigation.

6 Assessment Criteria

The laboratory analytical results have been screened against assessment criteria to assess the potential risk to potential receptors. The assessment criteria have been selected in accordance with MfE CLMG No. 2 Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011).

6.1 Human Health

The human health criteria have been selected in accordance with the NESCS, and the hierarchy defined by MfE CLMG No. 2 (MfE, 2011) and are summarised below. The NESCS does not apply to the construction / maintenance worker scenario, and the primary receptors are expected to be the commercial / industrial outdoor workers once the site is established into a yard, and when the site is developed for airport use after the yard is no longer required for seawall works. Criteria are summarised below:

- NESCS – Soil contaminant standards applicable to a ‘Commercial/industrial outdoor worker (unpaved) scenario have been selected.
- Australian National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure 1999 (updated 2013). Schedule B1, Table 1A(1). Health investigation levels (HIL) D for a ‘Commercial/industrial’ land use.
- MfE Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (revised 2011). Module 4 values applicable to SANDY SILT soils <1m in depth ‘residential’ (Table 4.11 & 4.14) land use scenario (i.e. conservative approach) have been selected.
- HEPA, 2025. PFAS NEMP Version 3.0, Table 5 – Human health investigation for ‘Industrial/commercial (HIL D) used.

6.2 Environmental

Terrestrial assessment criteria for the site have been obtained from:

- Landcare Research, July 2023. An implementation framework for ecological soil guideline values (Envirolink Grant C09X2206). Prepared for Contaminated Land and Waste Special Interest Group and Land Monitoring Forum. Ecological soil guideline values (Eco-SGV) for ‘Investigation Trigger (80%)’ used.
- Canadian Environmental Quality Guidelines (CCME) - Soil Quality Guidelines for the Protection of Environmental and Human Health. Canadian Council of Ministers of the Environment. Values for ‘commercial use applied.
- HEPA 2025. PFAS NEMP (Version 3). Table 6 – Ecological guideline values for soil. Value for perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) used for direct and indirect exposure.

The Eco-SGV provided by Landcare Research do not currently have regulatory status but have been included to follow the CLMG No. 2 hierarchy. Manaaki Whenua Landcare Research proposed that Eco-SGV do not apply to any impervious / impermeable surfaces (such as land/soil that is sealed, compacted driveway areas), given the unsuitability of these environments for any ecological receptors regardless of contamination issues. Therefore, terrestrial ecological criteria will not apply to the yard where a compacted aggregate surface is proposed and will only be applicable to soil in any buffer/landscaping areas.

PFAS NEMP (Version 3) notes that the indirect exposure value of 0.003 mg/kg may be over-protective if the area of exposed soil is too small to have any material impact on food chain transfer to secondary consumers such as invertivores and carnivores. In this situation, considering site-specific characteristics may justify the use of a higher value (up to 0.14 mg/kg). As the site is to be intensively developed and is not close to waterways the higher value of 0.14 mg/kg has been applied.

Criteria to assess potential risk to the aquatic environment were sourced from:

- Australian & New Zealand Guidelines for Fresh & Marine Water Quality (ANZG) 2018 – default guideline values (DGV) for marine water and freshwater.
- HEPA 2025. PFAS NEMP (Version 3.0). Table 8 - Ecological water quality DGV for PFOS and PFOA. Values for 'Freshwater' and '95% species protection' used.

PFAS NEMP (Version 3.0) states guidance should be sought from the environmental regulator to confirm specific jurisdictional requirements. The GWRC NRP Schedule V uses a 95% species protection level for coastal water. The PFAS NEMP directs that freshwater values are to be used on an interim basis until final marine guideline values can be set. In 2023 an ANZG interim DGV for PFOS was released however is in the process of being updated following public consultation on the technical brief.

To screen leachate concentrations from the SPLP, the DGV were multiplied by a Dilution and Attenuation Factor (DAF). When deriving waste acceptance criteria (WAC) for managed fills, WasteMINZ¹⁴ adopted a DAF of 20 as representative of the dilution of leaching porewater that will occur as the porewater / leachate travels to a groundwater abstraction point at the down-gradient boundary of the site. This was based on a USEPA (1996) weight of evidence finding that this value is conservative for a range of site conditions.

A further DAF of 5, giving a total DAF of 100, was assumed to be the minimum that would occur in groundwater discharging to a freshwater receiving environment, to account for dilution within a small stream. The coastal environment is a considerably higher energy environment than a small stream and higher dilution and attenuation is likely to occur. However, in the absence of deriving a site-specific DAF, a DAF of 100 has conservatively been applied when comparing leachate results.

This approach is consistent with the methodology used by GHD in a previous assessment of on-site disposal and management of PFAS-impacted soil from the Airport Carpark works¹⁵. The approach has been used to assess Rule R82(c)(ii) of the NRP for discharge into the marine waters.

6.3 Background Concentrations

Background concentrations for the site have been obtained from:

- URS New Zealand Ltd, 2003. Determinations of Common Pollutant Background Soil Concentrations for the Wellington Region. Table ES-1: Target analyte background soil concentration ranges for the Wellington region. Values for 'Main Soil Type 2 (Greywacke)' have been selected based on the main geological units provided in the URS document.

6.4 Disposal

In the event that excess spoil requires removal from site, soil analytical results have been compared to waste acceptance criteria from:

- MfE Hazardous Waste Guidelines. Landfill Waste Acceptance Criteria and Landfill Classification, 2004. Values for 'Class A waste acceptance criteria' used indicative of Southern Landfill and Silverstream Landfill.
- WasteMINZ, 2023. Technical Guidelines for Disposal to Land (Revision 3.1) Table H-2 Class 5 WAC for Organic Elements

¹⁴ WasteMINZ, 2023. Technical Guidelines for Disposal to Land (Revision 3.1)

¹⁵ GHD, 5 June 2024. GHD Assessment of Proposed Soil Disposal at Bridge Street from WIAL Golf Course [letter].

Silverstream Landfill recently recommenced accepting PFAS impacted material subject to GWRC approval on a case by case basis. PFAS-impacted soil is not generally accepted by other landfills in the lower North Island.

7 Results

7.1 Fieldwork Observations

The following was observed during fieldwork:

- Generally, ground conditions comprised little or no topsoil underlain by backfilled sand and marginal marine deposit sand.
- Suspected fill material was observed in the western portion of the site beyond 0.5 m bgl. This was characterised by darker silt soils which differed from the lithology observed in the eastern portion of the site. Specifically, darker subsoils were encountered at 1.0 m bgl in MGC_TP20, and soils were scheduled for PAH and TPH analysis.
- Fragments of orange clay pipe were encountered at 0.4 m bgl in TP14, and a sewage-like, organic odour was noted. No other odour was observed.
- Groundwater was not encountered in test pits within the site. Groundwater was encountered at 1.0 m bgl in a test pit approximately 180 m north of the site completed for a separate WIAL investigation on 16 July 2025.
- The pump shed adjacent to the pond was inspected (refer to photographs 33 to 35 in Appendix F). The external walls and roofing were constructed with painted corrugated metal, which was rusted and in poor condition in some places. The upper walls were constructed with painted gib board. The building was constructed on a concrete slab. Part of the building contained toilet facilities.

7.2 Soil Analytical Results

The results assessment table, containing soil analytical results compared to screening criteria, can be found in **Appendix I**.

7.2.1 Heavy Metals

39 soil samples (including 16 composite samples, and 2 duplicate samples) were analysed for heavy metals. Heavy metal concentrations did not exceed human health or environmental criteria in the samples analysed. Cadmium was above published background concentrations in two soil samples, ranging from 0.13 – 0.3 mg/kg, and arsenic (8 mg/kg) was marginally above the background concentration of 7 mg/kg. No other heavy metal concentrations exceeded background concentrations.

7.2.2 Polycyclic Aromatic Hydrocarbons

15 soil samples were analysed for PAH. Low concentrations of PAH compounds were detected in four samples below the human health and environmental criteria, and the background concentrations for the Wellington Region where available. PAH were not detected above the laboratory limit of reporting (LOR) in the other eleven samples.

7.2.3 Organochlorine Pesticides

Ten samples (including five composite samples) were analysed for OCPs. In summary:

- DDT isomers DDT and 4,4-DDE were detected in two composite samples (composite of MGC_HA31_0.1_T & MGC_HA32_0.1_T and composite of MGC_HA36_0.1_T & MGC_HA37_0.1_T) but did not exceed human health or environmental criteria the sum of DDT.

7.2.4 Per- and Polyfluoroalkyl Substances

50 soil samples (including four composite samples) were analysed for PFAS. PFAS in the form of perfluorooctane sulfonic acid (PFOS) and perfluorohexane sulfonic acid (PFHxS) were detected in 29

samples. PFAS concentrations did not exceed human health criteria. One sample from 1.0 m bgl in MGC_TP14 contained PFOS above the indirect exposure criteria for intensively developed sites.

In the test pit MGC_TP09, PFAS was only detected in the surface sample, and not at 0.3 m or 1.0 m bgl. In hand auger pits, MGC_HA06 and HA08, PFAS was detected to depth (0.3 m bgl). In test pits MGC_TP11, TP13, TP14, TP16, TP17, TP18, and TP20, PFAS were detected at surface and up to 1.0 m bgl.

7.3 Quality Assurance and Quality Control

Samples were received at the laboratory with temperatures ranging from 9.2°C to 19.9°C. This is warmer than the targeted 4°C. In most instances, samples were stored in the field in a chilly bin on ice, then delivered to the Wellington laboratory directly from the field and there was not sufficient time for the sample temperature to reduce. Elevated temperatures are not considered likely to have significantly impacted results as the temperatures were not warmer than environmental conditions and volatile organic compound were not contaminants of concern. The OCP concentrations encountered from the SVOC suite were consistent with those encountered in previous investigations at the golf course.

7.3.1 Duplicate Soil Samples

Two duplicate soil sample were collected and analysed for the same suite of analytes as the primary samples (heavy metals, PAH, OCPs and PFAS). The relative percentage difference (RPD) between concentrations in the primary and duplicate samples were calculated.

The RPD for lead was between 0 – 9.4% for lead and 0 – 6.1% for zinc. Otherwise, all heavy metal RPDs were either 0% or below the laboratory LOR and therefore not calculated. PFAS was below the LOR in the primary and duplicate sample analysed, and therefore an RPD cannot be calculated.

7.3.2 Equipment Rinsate Blank

An equipment rinsate blank was collected off tools (spade, hand auger) prior to hand digging using laboratory-supplied PFAS-free Type 1 water. The water sample was analysed for PFAS (trace). PFAS was not detected above the LOR indicating adequate decontamination practices.

This result indicates an acceptable level of accuracy in the sampling and analytical methods used in this investigation.

8 Discussion and Risk Assessment

8.1 Summary of Soil Analytical Results

In summary:

- Heavy metals, SVOC including OCPs and PAHs were not detected at concentrations that exceed human health or environmental assessment criteria. Cadmium and arsenic were present above published background concentrations in two locations but generally detected concentrations are considered commensurate with background concentrations.
- PFAS concentrations complied with human health criteria and direct terrestrial ecological criteria. One sample from 1.0 m bgl in MGC_TP14 contained PFOS above indirect terrestrial ecological criteria.
- The areas where PFAS was detected appear to correspond with the historical NAC apron and the immediately surrounding area (see the plan in **Appendix J**). The low PFAS concentrations in surface soils are potentially associated with the historical wastewater irrigation, but the highest concentrations were detected in TP14 at 1.0 m bgl and TP17 at 0.5 m bgl, and are likely associated with activity at the historical apron.

8.2 Ecological Considerations

When the site is developed into a yard it will be levelled, and the surface will be compacted aggregate. Manaaki Whenua Landcare Research proposed that Eco-SGV do not apply to any impervious / impermeable surfaces (such as land/soil that is sealed, compacted driveway areas), given the unsuitability of these environments for any ecological receptors regardless of contamination issues. Once the area is reinstated on completion of the construction, it is understood that the site will become an apron area as part of the expansion of Wellington Airport activities. This assessment has not looked at the proposed works associated with the apron expansion.

Should excavated material from the western area be moved to areas of the wider site that are proposed to be restored to ecological habitat (such as the proposed planting area along the eastern side of the golf course), topsoil will need to be imported to allow for planting. As Manaaki Whenua has proposed that the ecological soil guidelines apply to the upper 30 cm of soil¹⁶, the indirect ecological exposure pathway could be managed by maintaining at least 30 cm of unimpacted soil.

8.2.1 Marine Environment

The ecological criteria do not account for off-site environmental transport processes. The exposure pathway between the site and the marine environment may be complete via leaching to groundwater and discharge into the marine environment.

SPLP was completed on six soil samples within the western portion of the site and the leachate analysed for PFAS. Four samples were from the surface, and two were composited across the surface and 0.3 m bgl as the PFAS concentrations in the surface and 0.3 m bgl samples were the same order of magnitude and deemed to be representative of soil in the vadose zone that would be subject to rainfall infiltration. In summary: PFOA was not detected above the laboratory LOR in all leachate samples.

¹⁶ Manaaki Whenua identified that further research is required to identify the depth of soil to which it is appropriate for Eco-SGVs to apply. It is usually considered that the bulk of soil biological activity occurs in the upper 30 cm of soil (USEPA 2015), although soil microbes, invertebrates and plant roots can all be present at greater depths.

Concentrations of PFOS in leachate exceeded the 95% species protection level (interim marine) DGV in the five of the six samples analysed. When the DAF was applied all results complied with the DGVs.

8.3 Exposure Pathway Assessment

The preliminary CSM was updated to reflect the findings of the intrusive investigation. The exposure pathways were revised based on the soil contaminants detected and are presented in **Table 5**.

Table 5. Updated CSM

Source	Receptor	Pathway	Pathway Complete?
<ul style="list-style-type: none"> • Heavy metals • OCPs • PAH • PFAS • 	Construction workers	Exposure of workers to contaminants in soils and groundwater during site redevelopment – dermal contact, ingestion or inhalation of dust/vapours.	Incomplete Pathway – Based on the samples analysed, soil contaminant concentrations did not exceed human health assessment criteria. Maintenance / excavation workers are not a scenario considered by the NESCS. The Methodology ¹⁷ states it was considered more appropriate that exposure be limited through the site-specific controls that are required under health and safety legislation.
	Future site users	Exposure of future site users to contaminants in soils – dermal contact, ingestion or inhalation of dust/vapour.	Incomplete Pathway – Based on the samples analysed, soil contaminant concentrations did not exceed human health assessment criteria.
	Groundwater resources for public consumption	Leaching and migration of soil contaminants into groundwater.	Incomplete Pathway – There are no known registered potable groundwater bores in proximity to the site, and the site is not within a source protection zone.
	Terrestrial ecological receptors	Exposure of existing and future terrestrial ecological receptors to contaminants via dermal contact, ingestion, or inhalation of dust/vapour.	Incomplete Pathway – Sample concentrations from the surface are below the intensively developed sites indirect exposure criteria and the direct exposure criteria for all land uses. Therefore, the pathway is incomplete. If the standard conservative indirect exposure criteria are applied (0.003 mg/kg), 12 soil samples contain PFOS concentrations above the indirect exposure criteria. The more conservative criteria are only applicable for future receptors if soil is reused elsewhere in an unsealed area.

¹⁷ MfE, 2011. Methodology for Deriving Standard for Contaminants in Soil to Protect Human Health.

Source	Receptor	Pathway	Pathway Complete?
			Management and spoil handling / disposal will need to be considered during site works / development to minimise exposure of future terrestrial ecological receptors.
	Surface water	Sediment and runoff directly into surface water discharging into Lyall Bay.	Potentially Incomplete Pathway – It is understood that stormwater on the west side of the golf course drains to the airport stormwater network. Soil disturbance will be subject to standard erosion sediment controls preventing discharge to water.
		Migration of soil contaminants into surface water through shallow groundwater discharging into Lyall Bay.	Potentially Incomplete Pathway – Leachate testing on soil containing PFAS has indicated that with a DAF applied the soil to be disturbed will not generate PFAS concentrations that exceed DGV for fresh or marine water.

8.4 Limitations of Site Characterisation

Characterisation of subsurface conditions is dependent on the number of sample locations, methods of sampling and the uniformity of subsurface conditions. The accuracy of this characterisation is therefore limited by the scope of works undertaken in accordance with the MfE guidelines. There is the possibility that contamination present on the site has not been identified. Whilst contaminant concentrations may be estimated at chosen sample locations, conditions at any location removed from the specific points of sampling can only be inferred based on geological and hydrogeological conditions and the nature and the extent of identified contamination. Subsurface conditions can vary, resulting in uneven distribution of contaminants across a site which cannot be defined by these investigations. In addition, with time, the site conditions and environmental guidelines could change so that the reported assessments and conclusions are no longer valid. The conclusions of this report are made on the basis that the site conditions revealed by the investigation are representative of the actual conditions across the site at the time of sampling.

9 Development Implications

9.1 Consenting

9.1.1 NESCS

WIAL hold a consent from WCC under Regulation 11 of the NESCS, Rule 11.2.4 and Rule 32.2.1 of the Operative District Plan to *undertake disturbance of contaminated land associated with the operation and maintenance of Wellington International Airport* (SR520690). The following conditions of the consent are considered relevant to the proposed works:

- b) *Any soil disturbance works must be undertaken in accordance with the Contaminated Land Management Plan (CLMP) submitted with the application at all times. Should any works deviate from the CLMP, details must be provided to the Compliance Monitoring Officer (CMO) for certification. This certification must be obtained prior to works commencing.*
- c) *Prior to any soil disturbance works under this consent commencing, the consent holder must provide the following details to the CMO for information:*
 - i. *The scope (location and area) of the proposed works.*
 - ii. *Confirmation that any environmental management procedures are consistent with those in the CLMP.*
 - iii. *The disposal method and disposal location of any contaminated material.*
- d) *Any material with contaminant concentrations above background levels that is removed from the site must be disposed of at a licensed facility. Prior to starting work the consent holder must advise the Council's Compliance Monitoring Officer of the date when work will begin. This advice must include the address of the property and the Service Request number and be provided at least 48 hours before work starts, either by telephone on 04 801 4017 or email to rcmonitoring@wcc.govt.nz.*

9.1.2 Greater Wellington Natural Resources Plan

Rule R82 of the NRP covers discharges of a contaminant from contaminated land where a contaminant may enter water. To meet the permitted activity requirements, a DSI needs to be undertaken and provided to GWRC and the results of the DSI must indicate that the discharge does not pose unacceptable risks to human health or the environment. Otherwise, resource consent would be required under Rule R83 as a Discretionary Activity.

R82 also specifies that discharge from SLUR Category III land or SLUR Category IV land should not, or be likely to, result in water quality in a surface water body within 50 m of the source of the discharge exceeding the level specified for the protection of 95% of species. The site is currently shown on the GWRC SLUR as Category I – Verified History of Hazardous Activity or Industry.

Concentrations of PFOS in leachate from two soil sample locations exceeded the DGVs for the marine environment at the 95% species protection level. With a DAF applied, the samples did not exceed the DGVs. Discharges from soil that Project works are anticipated to disturb are not considered to pose unacceptable risks to human health or the environment should not require consent under R83.

9.2 Assessment of Reuse and Disposal Options

PFAS is present in soil to at least 1.0 m bgl in the area which corresponds with the former NAC apron. Soils from outside of this area generally meet the WasteMINZ cleanfill waste acceptance criteria.

The presence of PFAS in soils in this area will be the limiting factor for offsite disposal, or reuse on site. The sections below outline the various considerations for the PFAS impacted material.

9.2.1 Assessment of Reuse and Stockpiling Options

The following requirements from Section 12.1 of the PFAS NEMP has been considered to assess suitability of on-site reuse and stockpiling options:

- PFAS concentrations in soil and in leachate must be sufficiently low as to not pose an increased or unacceptable risk to receptors or to the environmental values of water.
- Leachate criteria should be protective of groundwater and surface water quality and aquatic ecosystems both at the site of reuse and anywhere there is a reasonable possibility that transported PFAS from that site may impact sensitive receptors and environmental values.
- Adding soil with low levels of PFAS to areas that have even lower or no levels of PFAS should be considered only in consultation with the relevant regulatory authority in exceptional circumstances where there is no feasible, practical alternative.

To meet the above criteria, analysis was completed on leachate via the methodology outlined in **Section 5.4**. SPLP analysis was completed of six samples to simulate potential effects of leaving PFAS-impacted soil in situ.

- Concentrations of PFOS in leachate exceeded the 95% species protection level (interim marine) in five of the six samples. With the DAF applied, the concentrations were below the DGVs.
- Five of six samples exceeded the PFOS and Sum PFHxS+PFOS waste acceptance criteria for an unlined landfill. However, all concentrations were below the double composite lined landfill criteria.

The 1.0 m bgl sample from MGC_TP14 contained a PFOS concentration an order of magnitude greater than all other soil samples analysed. Due to the elevated PFOS concentrations, the sample has been scheduled for leachate analysis to supplement the findings. As of 8 October 2025, the analytical results are pending and the DSI will be amended when results are received.

Currently, the site is classed as a 'Higher Risk' area under the CLMP given at the time of writing the CLMP no sampling had been undertaken within the area. Based on the results of this DSI the project area would meet the definition of a 'medium risk' area which is defined as:

"Areas which have been identified as areas above background concentrations of contaminants, but below human health guideline values, or locations where no known HAIL activities have been undertaken and no investigations have been undertaken. Work in these locations can be undertaken with a management plan, with contaminant discovery protocols."

Works in this area (shown on the plan in **Appendix K**) should be undertaken in accordance with the controls outlined for a 'medium risk' area in the western portion of the site. Areas outside of this meet the 'lower risk' definition and should follow the appropriate procedures outlined in the CLMP.

9.2.2 Suitability for reuse on site

The soil in the western portion of the site is considered to be suitable to be reused, subject to soil being located at least 0.3 m bgl for terrestrial ecological purposes if used in an unsealed area.

9.2.2.1 On-Site Storage

If temporary storage and stockpiling of PFAS contaminated soil occurs on site, it should be undertaken in such a way that PFAS cannot migrate into the surrounding soil or water and runoff should be monitored for PFAS. Depending on the period of time the soil will be stockpiled for, this may require different levels of controls and infrastructure (e.g. temporarily covering the stockpile on an impervious liner, stockpiling within a sealed and bunded area, or capping and containment for long term management). Long-term monitoring may be required if soil is to be stored on site.

9.2.2.2 Storage off-site on WIAL Property

Soil from the airport fire station works is currently being stored on Bridge Street within the airport site. WIAL has applied for two resource consents to allow for the continued use of this site. These consents provide for:

- The storage of fill material, including contaminated spoil, on the disposal site located on Bridge Street, adjacent to the airport runway; and
- Global earthworks, including for the disposal of contaminated spoil, across the wider Airport landholdings.

If the contaminated soil from the golf course falls within the parameters defined by these consents (which are subject to change until a decision is issued), or any future consents obtained by WIAL for the disposal of fill material, WIAL will preferentially seek to retain and manage contaminated soil on-site.

9.2.3 Off-Site Disposal

If off-site disposal is required, the presence of PFAS in soil will be the limiting factor. Silverstream Landfill recently recommenced accepting PFAS impacted material subject to GWRC approval on a case by case basis and available airspace at the time of the application for acceptance. The PFAS concentrations detected in the soil meet the Silverstream Landfill waste acceptance criteria. PFAS is not generally being accepted at any other landfills in the lower North Island.

Cuts of up to 4 to 5m are proposed in the part of yard overlapping the former apron area. As sampling was limited to 1m bgl in this area, further sampling for PFAS analysis may be required in this area to delineate the vertical extent for spoil disposal purposes. The need for further sampling should be clarified with the chosen receiving facility before removing soil from site.

Prior approval must be sought from the landfill prior to works commencing.

10 Conclusions and Recommendations

10.1 Conclusions

The following conclusions were made based on the analytical results:

- At the concentrations encountered, exposure pathways for human receptors and ecological receptors are considered incomplete.
- Soils in the western part of the site that historically contained the NAC apron contain PFOS at concentrations above the conservative ecological indirect exposure criteria. This criterion is not considered relevant while the area is used by a yard and covered by a compacted surface. If areas are to be restored to ecological habitat, they will require importing of topsoil to allow for planting; a cover of 30 cm should be maintained.
- WIAL hold a consent from WCC under Regulation 11 of the NESCS, Rule 11.2.4 and Rule 32.2.1 of the Operative District Plan to undertake disturbance of contaminated land associated with the operation and maintenance of Wellington International Airport (SR520690). Section 9.1 outlines the relevant provisions of the consent that are required to be complied with.
- Currently, the site is classed as a 'Higher Risk' area under the WIAL site-wide CLMP given at the time of writing the CLMP no sampling had been undertaken within the area. Based on the results of this DSI the site would meet the definition of a 'medium risk' area.
- Discharges associated with soil disturbance at the site for the project should not require consent under rules R82 and R83 of the NRP as the leachate results to date indicate that contaminant concentrations are not likely to pose an unacceptable risk to the receiving marine environment.
- The potential for discharge of contaminants from soil within the site during the soil disturbance works can be readily managed via the recommended standard erosion and sediment control measures.
- Excess spoil from outside of the PFAS impacted area is suitable for reuse or disposal as cleanfill.

10.2 Recommendations

Based on the findings, the following recommendations are made:

- Based on the results of this DSI the site meets the definition of a 'medium risk' area in the site-wide CLMP. The CLMP which provides procedures for handling / management of spoil, and unexpected discoveries should be referred to throughout soil disturbance works.
- An ESCP be prepared for works, which includes working with PFAS-impacted material.
- If off-site disposal of excess spoil which contains PFAS is required, an application for acceptance at Silverstream Landfill, or other appropriately licensed disposal facility is made prior for disturbance of that soil.

11 Limitations

This report has been prepared by Beca Ltd (Beca) for Wellington International Airport Limited (Client). Beca has been requested by the Client to provide a Detailed Site Investigation in regard to proposed works on in the southern portion of the Miramar Golf Course. This report is prepared solely for the purpose of assessing potential environmental and human health risk from soils (the agreed scope of work) and to support an application by the Client for statutory approvals in relation to renewal of the Southern Seawall at Moa Point Road. The contents of this report may not be used by the Client for any purpose other than in accordance with the stated Scope.

Beca acknowledges the Practice and Procedure Guidance, dated 22 July 2025, provided by the Panel Conveners appointed under the Fast-track Approvals Act 2024, which states that “reports that are intended to be relied on by the panel should not be submitted with a disclaimer stating that the report is not for use by persons other than the applicant”. This report, however, serves a dual purpose; it supports the application for approvals for the Southern Seawall and serves a wider regulatory function, having been prepared under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESC), the contaminated land rules of the Greater Wellington Regional Council (GWRC) Natural Resources Plan (NRP), and the contaminated land rules in Chapter 32 of the Wellington City Council (WCC) District Plan.

This report has been prepared by Beca on the specific instructions of our Client. It is solely for our Client’s use for the purpose for which it is intended in accordance with the agreed scope of work. Any use or reliance by any person contrary to the above, to which Beca has not given its prior written consent, is at that person’s own risk and Beca accepts no liability to any other person for their use of or reliance on this report. This report contains information obtained by inspection, sampling, testing or other means of investigation. Unless specifically stated otherwise in this report, Beca has relied on the accuracy, completeness, currency and sufficiency of all information provided to it by, or on behalf of, the Client or any third party, including the information listed above, and has not independently verified the information provided. Beca accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the information provided. Publicly available records are frequently inaccurate or incomplete.

The contents of this report are based upon our understanding and interpretation of current legislation and guidelines (“Standards”) as consulting professionals and should not be construed as legal opinions or advice. Unless special arrangements are made, this report will not be updated to take account of subsequent changes to any such Standards.

This report should be read in full, having regard to all stated assumptions, limitations, and disclaimers.

A

Appendix A – Plan of Proposed Works



NOTES:

1. CADASTRAL INFORMATION FROM LINZ DATA BASE AND IN NEW ZEALAND TRANSVERSE MERCATOR 2000 (NZTM2000) COORDINATE SYSTEM.
2. MODEL BASED ON EXISTING SURFACE DTM FROM 2013 LIDAR DATA & HISTORIC AIRFIELD TOPOGRAPHIC SURVEY WHERE AVAILABLE AND HEIGHT ADJUSTED TO NZVD2016 BY REDUCING LEVELS BY 0.488m MANUALLY FOR THIS EXERCISE. LEVELS ARE TO BE CONFIRMED BY A REGISTERED SURVEYOR.
3. INFORMATION ARE ADOPTED FROM WELLINGTON AIRPORT RECORDS, WELLINGTON CITY COUNCIL GIS, AND BEFORE U DIG INFORMATION. SOME SERVICES MIGHT BE DUPLICATED WHICH ARE RETRIEVED FROM VARIOUS SOURCES. NO GUARANTEE IS GIVEN TO THE COMPLETENESS OF SERVICES INFORMATION. CONTRACTOR TO VERIFY SERVICES LOCATION ON SITE PRIOR TO CONSTRUCTION.

LEGEND:

-  CONSTRUCTION YARD DEMARCATION
-  INDICATIVE LANDSCAPE BUFFER ZONE
-  EAST SIDE AREA ACCESS AND CARPARKS
-  EXISTING SECURITY FENCE (APPROX)
-  EXISTING SANITARY SEWER
-  EXISTING STORMWATER
-  EXISTING WATER
-  EXISTING 11KV HV CABLE
-  EXISTING COMMUNICATIONS

INDICATIVE LANDSCAPE BUFFER ZONE - STAGE 2
AREA ≈ 2.625ha

EAST SIDE AREA ADDITIONAL RENTAL CAR PARK
REFER HOLMES DRAWINGS

NOT FOR USE BY SEA DEFENCES PROJECT
RENTAL CAR PARK

PROPOSED EAST SIDE AREA ACCESS TO
ADDITIONAL RENTAL CARPARK AREA

SITE YARD / LAYDOWN YARD
APPROX. AREA - UP TO 4.54 ha

INDICATIVE LANDSCAPE BUFFER ZONE - FUTURE
AREA ≈ 1.358ha

MIRAMAR GOLF COURSE
PROPERTY BOUNDARY

EXISTING STORMWATER

EXISTING STORMWATER POND

EXISTING HV
SUBSTATION

EXISTING SEWER, HV & STORMWATER

APPROXIMATE LOCATION OF
EXISTING SECURITY FENCE

WELLINGTON INTERNATIONAL AIRPORT

MOA POINT
WWTP

60
40
20
0
FULL SIZE 1:1000; HALF SIZE 1:2000
SCALE (m)

**ORIGINAL DRAWING
IN COLOUR**

**DETAILED DESIGN
NOT FOR CONSTRUCTION**

No.	Revision	By	Chk	Appd	Date
A	FOR DETAILED DESIGN	SZ	TNM	JH	13.03.25

Original Scale (A1)	Design	TNM	20.12.24	Approved For Construction*
1:1,000	Drawn	SZ	20.12.24	
Reduce Scale (A3)	Dwg Verifier	CJB	20.12.24	
1:2,000	Dwg Check	CGK	20.12.24	Date

* Refer to Revision 1 for Original Signature



Client: **WIAL SEA DEFENCE STRUCTURES RENEWAL**

Title: **MGC CONSTRUCTION YARD EXISTING CONTOURS & SERVICES LAYOUT PLAN**

Discipline: **CIVIL ENGINEERING**
Drawing No: **3324338-CA-0200** Rev: **A**

B

Appendix B – Additional Information

CITY ENGINEERS DEPT.

178

NATIONAL AIRWAYS CORPORATION.

670

WELLINGTON AIRPORT.

PETROL INSTALLATION - FREIGHT SHED.

48/640

Petrol Installation
Freight Shed. (N.A.C.)C.E.
FILE N

JS. R.
 28.9.59 - J.F. 12.2.62
 AVG. 22.9.59 13.2.62
 CASH. 29.9.59
 1.10.59
 JSR. 19.11.59
 AVG. 20.11.59
 23.11.59
 JSR 20.1.60
 20.1.60
 JSR 29.1.62
 CASH. 31.1.62

20 NOV 1959
 26 NOV 1960

D.R. Housley

734

DRH:EH 48/640

27 June 1975

The Branch Manager,
Mobil Oil NZ Ltd.,
P.O. Box 38-073,
PETONE.

Dear Sir,

INSTALLATION OF TWO 10,000 LITRE UNDERGROUND TANKS :
WELLINGTON AIRPORT : N.A.C.

With reference to your application dated 24 June 1975, I hereby give approval for the above installation as per layout plan submitted.

All work shall be carried out in accordance with the Dangerous Goods Regulations 1958.

Yours faithfully,


Building Superintendent
for City Engineer

Mobil Oil New Zealand Limited

SEAVIEW ROAD LOWER HUTT
P.O. BOX 38-073 PETONE
TELEPHONE 683-089
TELEGRAMS & CABLES 'MOBIL OIL'

REF.:

June 24, 1975

Wellington City Corporation,
P.O. Box 2199,
WELLINGTON.

Attention: Mr D. Hausley

N.A.C. ENGINEERING
WELLINGTON AIRPORT

Dear Sir:

We seek your approval to install a 10,000 litre tank for the storage of diesel.

On the behalf of N.A.C. and BP (N.Z.) Limited we also seek permission to install a 10,000 litre tank for the storage of super gasoline, all to the enclosed plan.

Yours faithfully,

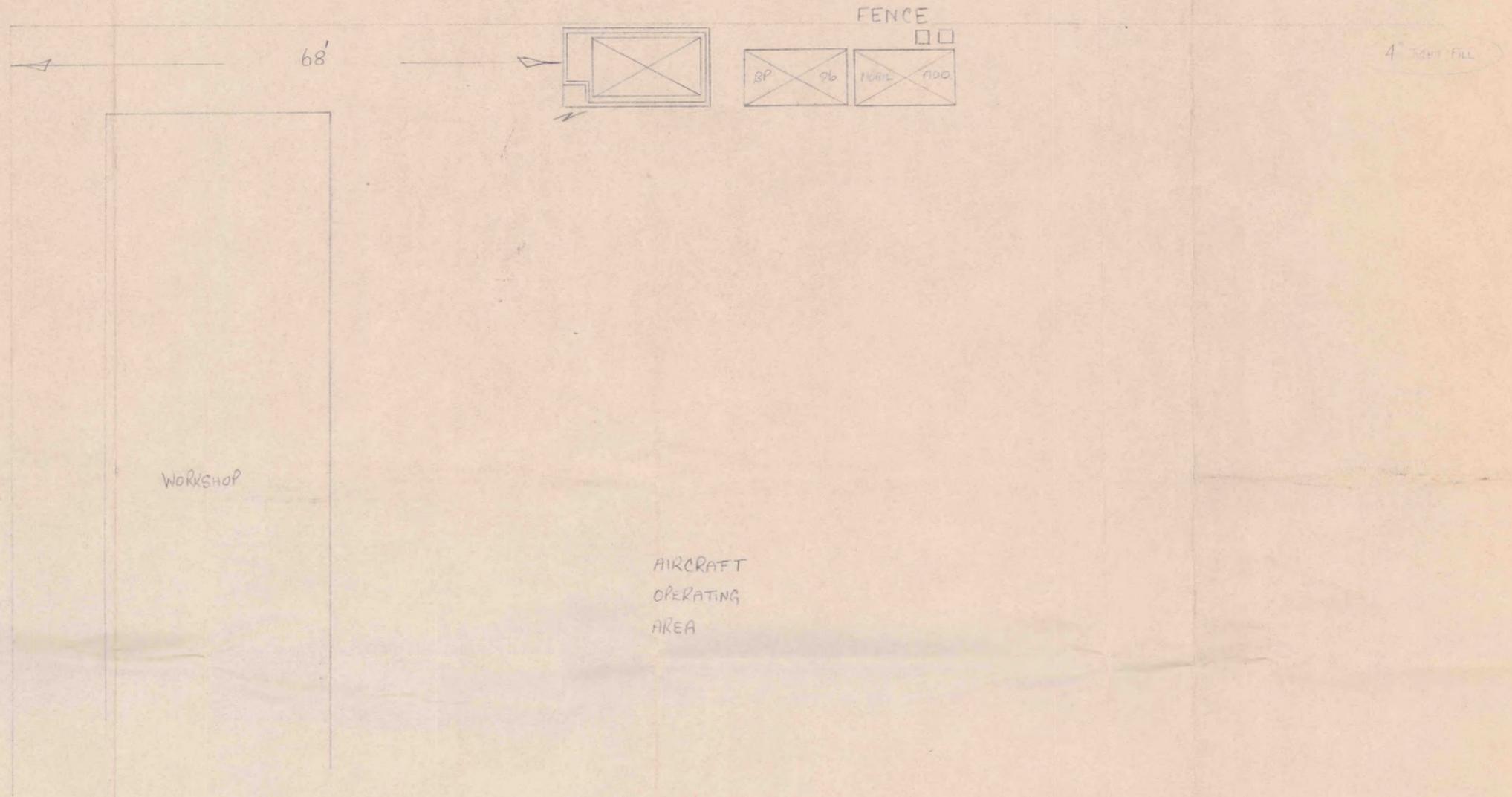

R.D. Stein
BRANCH MANAGER

By:
M.B. Wightwick

MBW:apr

ISSUE

MIRAMAR GOLF CLUB

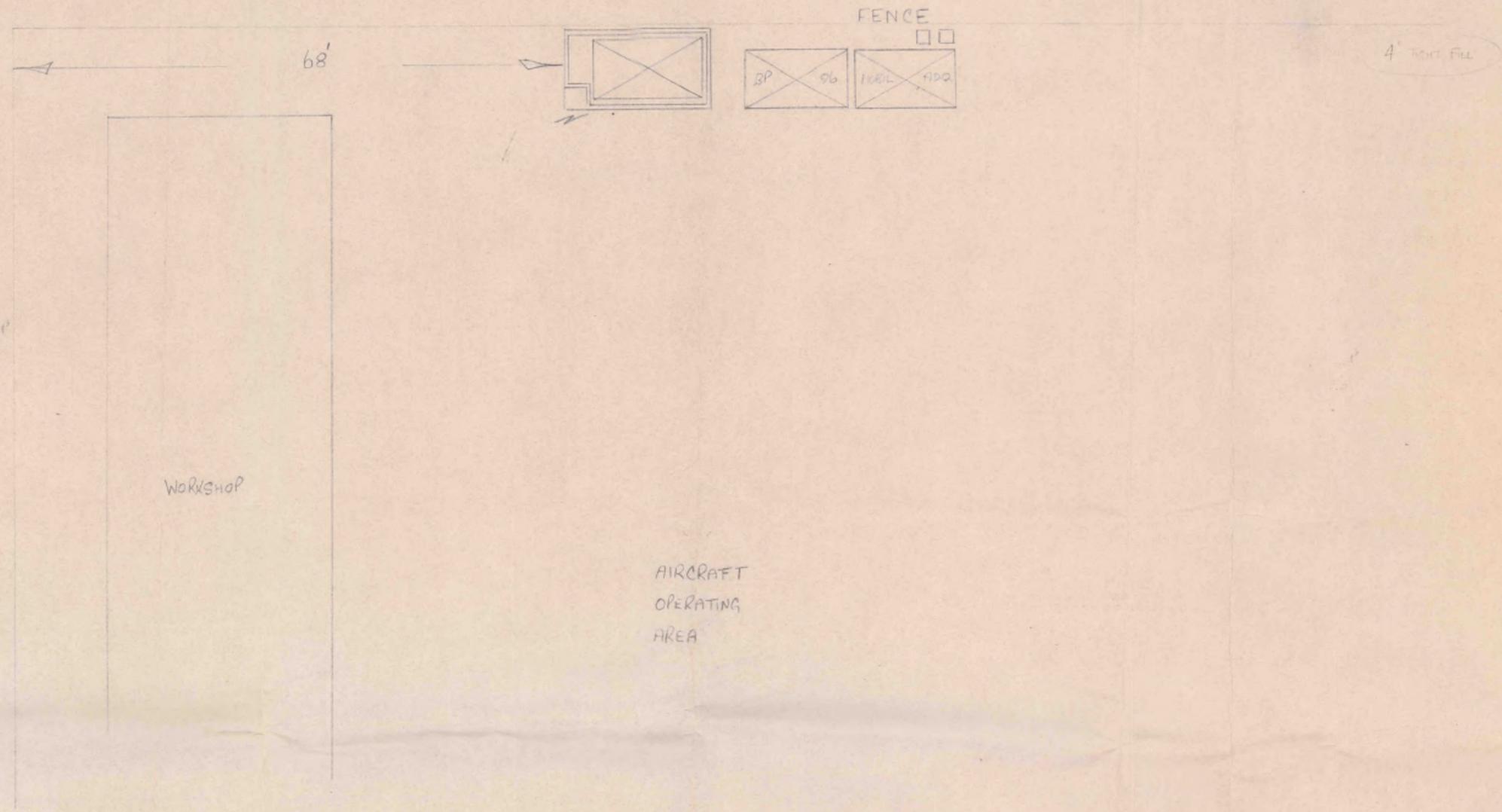


ISSUE No	ALTERATIONS

PROPOSED 4/6 STORAGE FOR DIESEL & SUPER GASOLINE
AT NAC ENGINEERING WELLINGTON AIRPORT

DRAWN			D
TRACED			
CHECKED			
APPROVED			
SCALE			

MIRAMAR GOLF CLUB



HANGER

ISSUE No	ALTERATIONS

PROPOSED U/G STORAGE FOR DIESEL & SUPER GASOLINE
 AT NAC ENGINEERING WELLINGTON AIRPORT.

DRAWN			D
TRACED			
CHECKED			
APPROVED			
SCALE			

A. J. Milne

736

AJM:EH 48/640

20 November 1973

The Manager,
Mobil Oil (NZ) Ltd.,
P.O. Box 873,
WELLINGTON.

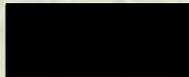
Dear Sir,

INSTALLATION OF 10,000 LITRE ABOVE GROUND METHANOL TANK :
WELLINGTON AIRPORT S/N. A. C.

With reference to above installation, I have to advise that the proposal has been approved under Section 22 of the Dangerous Goods Act 1957, by the Chief Inspector of Explosives, Department of Internal Affairs, subject to the condition that the tank is resited a minimum distance of 6'-0" from the boundary.

This is in line with the proposed Dangerous Goods Regulations coming into effect next year.

Yours faithfully,


Building Superintendent
for City Engineer

MINUTE SHEET

Subject:

Department:

Exp

File No.

6/8/28

Date:

13 Nov 73

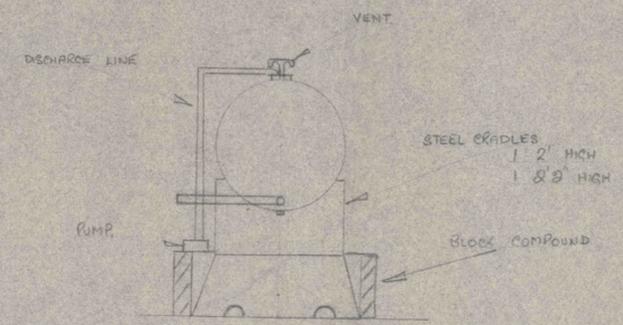
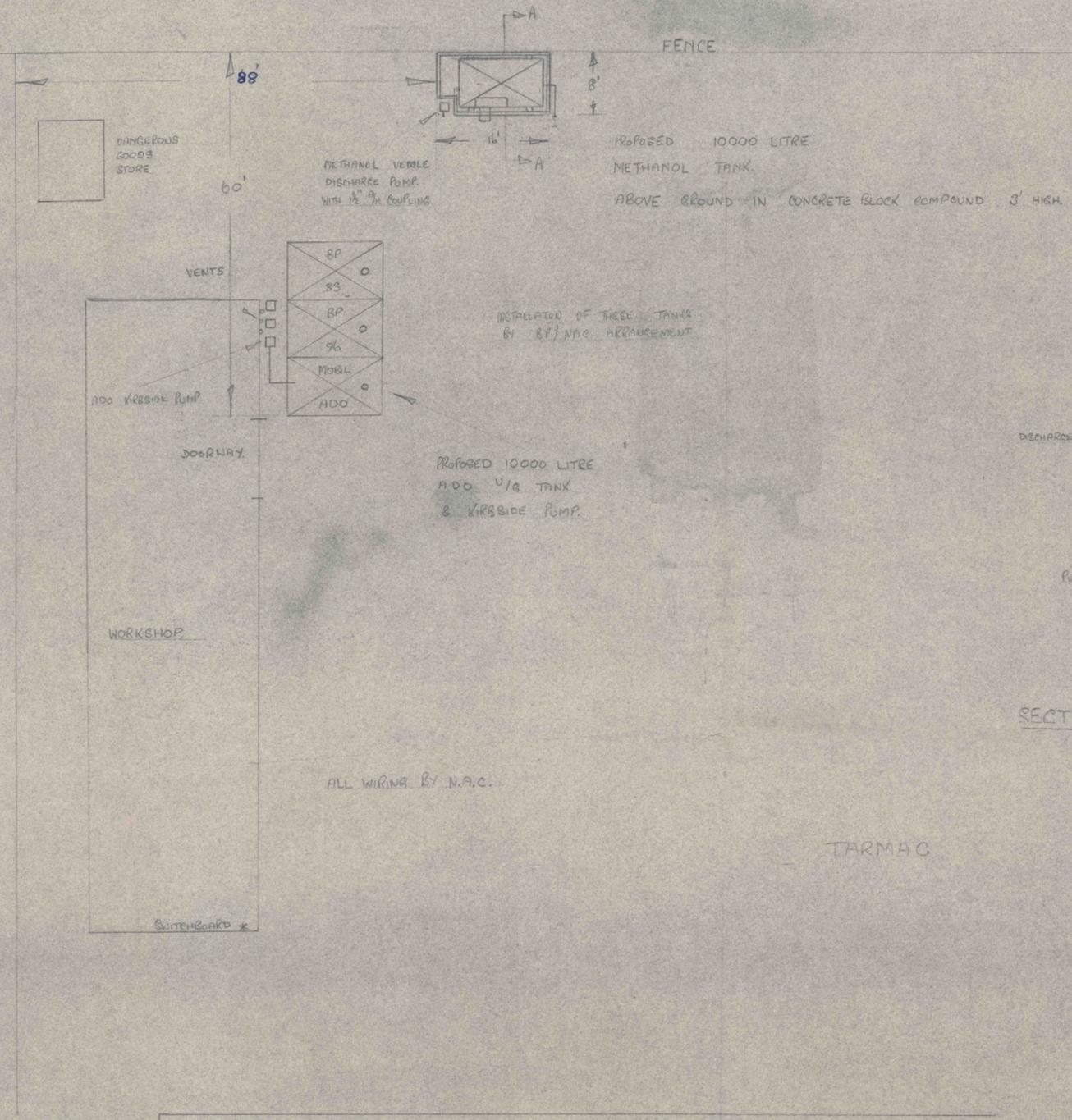
To—

Dangerous
Goods
Inspector
Wgtn City
Corp.

Proposal as detailed in plan submitted
approved subject to Methanol/water
tank being at least 6 feet from
boundary

APPROVED
13 NOV 1973
[Redacted Signature]

MIRAMAR GOLF CLUB



SECTION A-A CONCRETE FENITH 3' HIGH 12' WIDE

ALL WIRING BY N.A.C.

TARMAC

HANGER

ISSUE No.	ALTERATIONS

PROPOSED INSTALLATION OF METHANOL & A.D.O. AT WELLINGTON AIRPORT

DRAWN			
TRACED			
CHECKED			
APPROVED			
			SCALE

B

48/640 GB/EM,

9th February, 1962.

The Manager,
Standard Vacuum Oil Company (N.Z.) Ltd.,
P.O. Box 391,
WELLINGTON.

Dear Sir,

INSTALLATION OF A 300 GALLON FUEL OIL
OVERHEAD TANK FOR N.A.C. (HANGAR SITE)
WELLINGTON AIRPORT.

In reply to your application of 26th January, 1962, I hereby give approval for the above installation, as per attached layout plan submitted.

All work shall be carried out in accordance with the Dangerous Goods Regulations of 1958.

Yours faithfully,

City Engineer.



JSR/CB 48/640

8th February 1962.

MR. BAKER, DANGEROUS GOODS INSPECTOR.

With reference to the application dated 26th January 1962, from the Standard Vacuum Oil Company, for permission to install a tank to carry diesel fuel on the N.A.C. hanger area at Rongotai Airport, I have discussed this with Mr. Redstone, Airport Manager. He advises that the proposed location is within the area of land leased by N.A.C. for its hangar site, and that so far as he is concerned, a licence may be issued. Therefore the licence may be issued, subject to the normal dangerous goods requirements.

ENTERED

[REDACTED]

[REDACTED]

Divisional Engineer.

[REDACTED]

[REDACTED]

9.2.62

[REDACTED]

9/2/62



48/640

STANDARD-VACUUM OIL COMPANY (N.Z.) LTD.

ANVIL HOUSE, WAKEFIELD STREET,
WELLINGTON, C.1.
NEW ZEALAND



January 26, 1962

City Engineer,
WELLINGTON CITY COUNCIL

Attention: Dangerous Goods Inspector.

Dear Sir,

We have been approached by Mr. Ballard, Chief Engineer of N.A.C. to install a 500 gallon overhead tank to carry diesel fuel. ³⁰⁰

The proposed site of installation is by the Dangerous Goods shed at the rear of the Main Hanger as shown on the attached sketch.

If there is any further particulars you may require, we will be only too pleased to supply them.

Yours faithfully,

[Redacted signature]

Sales Representative.

CWB/gmm

[Redacted]
*Advised 300 gallons tank
7/2/62*

[Redacted]

[Redacted]

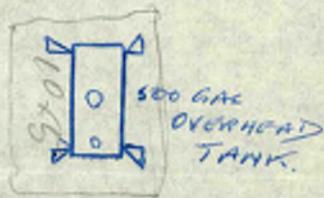
31.1.62

[Redacted]

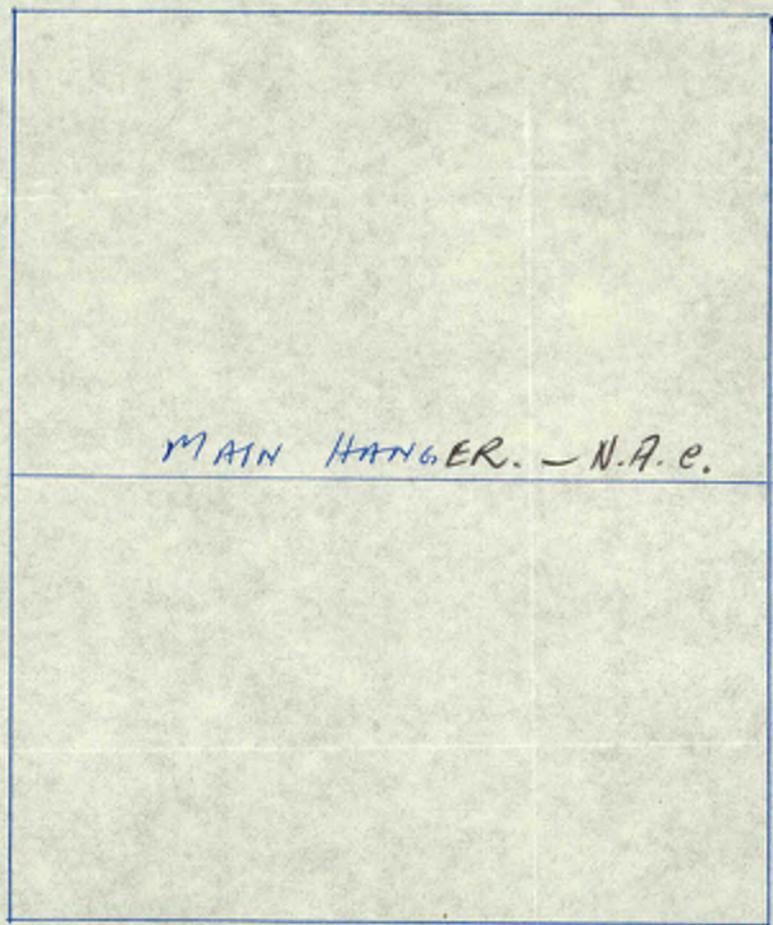
30.1.62

1/2/62

DANGEROUS GOODS
SHED



Laid on steel frame
and corrouded.



RONGOTAI AIRPORT

CITY ENGINEER'S DEPARTMENT

Town Clerk's File No. 58/3/37/1. Minute Dated 5. 10. 59

City Engineer Underground Petrol Tank - Wellington Airport - National Airways. Corp.,

Letter of 24. 9. 59 to note please. *- copy next below.*

MR. ROBERTS.
19. 11. 59



20. 11. 59



21/11/59

C O P Y

NEW ZEALAND
NATIONAL AIRWAYS CORPORATION

September 24, 1959.

The Town Clerk,
P.O. Box 2199,
WELLINGTON.

Dear Sir,

UNDERGROUND PETROL TANK : WELLINGTON AIRPORT.

Thank you for your letter of September 18, advising that City Council's approval of our application for the installation of an underground petrol tank and dispensing pump.

The Corporation accepts the following conditions regarding this installation:

"The installation must be made in accordance with the Dangerous Goods Regulations and subject to any special requirements by the City Engineer's Department.

The installation must be subject to the conditions set out in the License dated 12th August 1959 in so far as they apply.

The installation must be removed and any damaged surfaces made good at the cost of the National Airways Corporation, should the existing license be revoked for any reason."

Yours faithfully,

(sgd) D.W. JOHNSTON

General Services Manager.

CITY ENGINEER'S DEPARTMENT

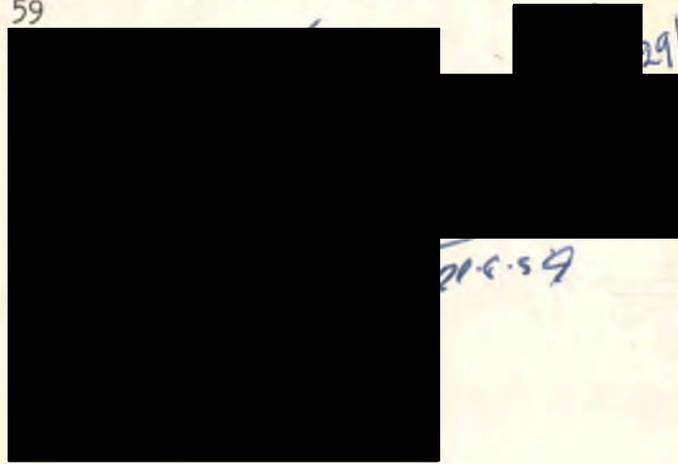
Town Clerk's File No. 58/3/37/1 Minute Dated 22. 9. 59

City Engineer

Deed of License: Wellington Airport Freight Building and
Link Trainer Building: N.Z.N.A.C.

To note minute of 21. 9. 59 please.

MR. ROBERTS
28. 9. 59



29/9/59.

28.9.59

CITY ENGINEER'S DEPARTMENT

Town Clerk's File No. 58/3/37/1

Minute Dated 21. 9. 59

City Engineer

AIRPORT CTTEE 8. 9. 59
Report Approved.

COUNCIL 16. 9. 59
Committee Report Adopted.

To note copy of letter dated 18th September to N.A.C.,P .O.Box 96

"With reference to your application to the City Engineer, I have to inform you that the Council is prepared to approve of the installation on the freight shed site at the Wellington Airport, of an underground petrol tank and pump required to service your Corporation's transport vehicles, subject to the following conditions.

1. The installation must be made in accordance with the Dangerous Goods Regulations and subject to any special requirements by the City Engineer's Dept
2. The installation must be subject to the conditions set out in the license dated 12th August 1959 in so far as they apply.
3. The installation must be removed and any damaged surfaces made good at the cost of the National Airways Corporation, should the existing license be revoked for any reason.

An application made by B.P. (N.Z.) Limited, to make the installation has also been approved.

Would you please let me have your written acceptance of the foregoing conditions.

MR. ROBERTS
28. 9. 59

Mr Coffin to note. See also reply from N.A.C. Mr Hunter C/Sd office says Dangerous Goods licence may now be issued

[Redacted]

29/9/59

58.582

7th September, 1959.

Messrs. Kofoed & Arnold,
Registered Architects,
3rd Floor,
Dominion Building,
Wakefield Street,
WELLINGTON. C.1.

Petrol Installation : N.A.C. Freight Shed :
Wellington Airport.

Dear Sirs,

In reply to your letter dated 26th August, 1959, I have to advise that your application, on behalf of the National Airways Corporation, to install a petrol dispensing unit at Wellington Airport, has been submitted to Council for their approval, and you will be further advised in due course.

Yours faithfully,

City Engineer. *S/S)*

7th September, 1959

AWG:JS
[REDACTED]

MEMO FOR TOWN CLERK.

: PETROL INSTALLATION : N.A.C. FREIGHT SHED.

The National Airways Corporation hold a licence (Deed 7500) to occupy a site at Wellington Airport for a Freight Building and associated activities. Clause 12 of the Conditions pertaining to the above licence, states "... and will not without the previous consent of the Corporation, keep on the said land or premises, any materials of a dangerous or explosive nature ..."

I have received an application from the Corporation that they be permitted to install on their Freight Shed site, an underground petrol tank and pump installation, which, it is understood, is required to service the Corporation's own transport vehicles. It is not intended that the installation be used for the general sale of motor spirit.

I have to recommend that this application be approved, subject to the following conditions -

1. That the installation be made in accordance with the Dangerous Goods Regulations and with any special requirements made by this Department.
2. That the installation be subject to the conditions set out in the above Deed, in so far as they apply.
3. That the installation be removed, and any damaged surfaces made good at the cost of the National Airways Corporation, should the existing licence be revoked for any reason.

In connection with the above, I have also received an application from BP (New Zealand) Limited, to make the installation, referred to above, on behalf of National Airways Corporation.

I recommend that this application be approved subject to the Company carrying out the work in accordance with the Dangerous Goods Regulations. The Company should also be required to make good any surface damage made as a result of carrying out the installation, and first contact this Department for instructions regarding finished levels, etc.

[REDACTED]
18230
Est 610 }
City Engineer. }

H W G

48/640

BP (NEW ZEALAND) LIMITED

G.P. Box 1099
WELLINGTON

TELEPHONE: 70-409 (5 LINES)

TELEGRAPHIC ADDRESS
"BEEPEE, WELLINGTON"



BRANCH OFFICE:

39 PIPI TEA STREET,
WELLINGTON, N.I.

IN REPLY—
PLEASE QUOTE
THIS REFERENCE

C/F

28th August, 1959.

City Engineer,
Wellington City Council,
WELLINGTON.

Dear Sir,

NATIONAL AIRWAYS CORPORATION RONGOTAI

We wish to advise of our intention to instal, in a concrete pit, for the storage of motor spirit, 1 x 1000 tank connected to an electric pump.

All work to be carried out in strict accordance with Dangerous Goods Regulations.

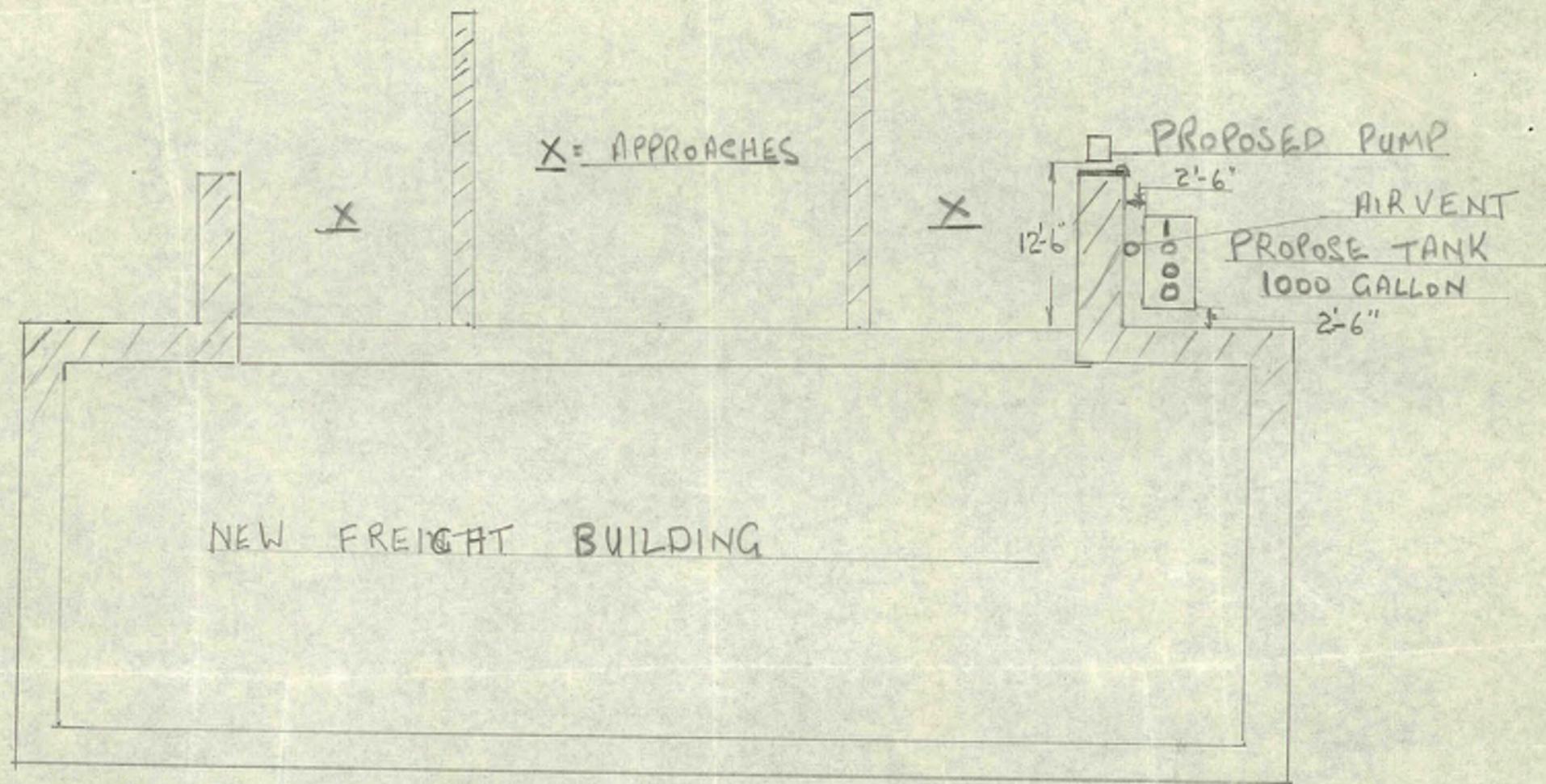
Enclosed please find sketch of proposed installation.

Yours faithfully,
BP (NEW ZEALAND) LIMITED

[REDACTED]
[REDACTED]
[REDACTED] BRANCH MANAGER

SJH/H

H-9-59



PROPOSE INSTALLATION AT NATIONAL AIRWAYS CORP. RONGOTAI

KOFOED & ARNOLD

REGISTERED ARCHITECTS

THIRD FLOOR, DOMINION BUILDING, WAKEFIELD ST., WELLINGTON C.I.

AS/640 ✓

A. G. KOFOED B.A.R.C.H., A.R.I.B.A., A.N.Z.I.A.
L. K. ARNOLD A.N.Z.I.A.

Telephone 46-124 2 Lines

26th August 1959

The City Engineer,
Wellington City Council,
P.O. Box 2199,
WELLINGTON.



Dear Sir,

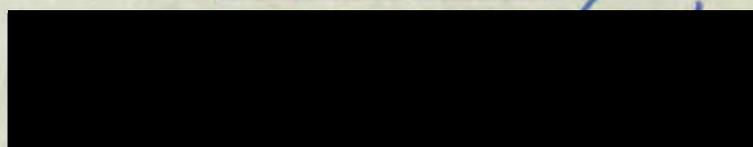
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B.P. will apply for an installation permit from your Department but we should be pleased if you could give us authority, under the lease arrangement subject to your Department granting a permit in the normal manner.

Yours faithfully,

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WIAL Uncovered Car Park

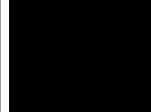
Assessment of Dewatering Effects

Wellington International Airport

5 July 2024

→ The Power of Commitment



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GHD Limited

Contact: Raoul Fernandes, Technical Lead - Hydrogeology | GHD
 138 Victoria Street, Level 3
 Christchurch Central, Canterbury 8013, New Zealand
 T +64 3 378 0900 | F +64 3 377 8575 | E chcmail@ghd.com | ghd.com

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Appendices

Appendix A	Detailed Design Drawings
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1. Introduction

1.1 Project background

GHD Limited (GHD) has been engaged by Wellington International Airport Limited (WIAL) to prepare a resource consent application for activities related to the construction of a new temporary carpark and associated stormwater drainage system (as shown in Figure 1).



Figure 1 Location map of the site and surrounding area

The resource consent will be sought from the Greater Wellington Regional Council (GWRC), covering the following activities:

- Construction phase dewatering.
- Disposal of dewatering water.
- Operational stormwater.

This report outlines the groundwater construction dewatering assessment (including a settlement assessment) for the construction works related to the installation of the stormwater drainage system alongside the current airport parking area. It is likely that the trench required to install the stormwater system will intercept the groundwater table and, therefore, will require dewatering while being installed to allow work to be completed in the dry.

1.2 Proposed activity

The project entails installing a 300-metre stormwater drainage system that requires the excavation of a trench up to 3 m in depth. The installation trench will follow the edge of the existing car park, along the western edge of the current Miramar golf course. The project location, near a wetland which meets the definition of natural inland wetland under the National Policy Statement for Freshwater Management, along with its proximity to the groundwater level, necessitates careful environmental consideration.

Table 1 presents the proposed excavation summary and has been prepared based on communication with the design team and on the proposed alignment drawings found in Appendix A.

Table 1 Proposed excavations summary

Parameter	Value
300 m long trench - Dimensions (L x W x maximum D) [m x m x m]	300 x 1 x 3
Open duration (100m sections) – maximum estimated (days)	18

1.3 Purpose of this report

This report presents a summary of the hydrogeological site setting, as interpreted from site investigations undertaken by Pattle Delamore Partners (2023)¹ and BECA (2020)² and an assessment of effects that may occur from construction-related dewatering, including estimating settlement due to dewatering and associated effects on existing buildings and infrastructure, and the effects of dewatering on a nearby wetland.

This assessment has been completed to support the resource consent application for the construction related dewatering based on the parameters listed in Table 1.

1.4 Scope and limitations

This report: has been prepared by GHD for Wellington International Airport and may only be used and relied on by Wellington International Airport for the purpose agreed between GHD and Wellington International Airport as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than Wellington International Airport arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Wellington International Airport and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

It should be noted that because of the inherent uncertainties in subsurface evaluations, changed or unanticipated ground and groundwater conditions may occur that could affect total project cost and/or execution. GHD does not accept responsibility for the consequences of significant variances in the conditions and the requirements for execution of the work. If the revealed conditions do not accord with those assumed in this report the matter should be referred back to GHD.

¹ PDP (2020). Miramar Golf Club development: Adventure Golf – Dewatering assessment.

² BECA (2020). WIAL Master Grading Retaining wall – Geotech Desktop Study (Revised)

The advice tendered in this report is based on information obtained from the investigation locations tests points and sample points and is not warranted in respect to the conditions that may be encountered across the site at other than these locations. It is emphasised that the actual characteristics of the subsurface materials may vary significantly between adjacent test points and sample intervals and at locations other than where observations, explorations and investigations have been made. Subsurface conditions, including groundwater levels and contaminant concentrations can change with time. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

Ground conditions are inferred if no subsurface investigations have been conducted as part of this commission. Future investigations and/or construction may reveal different ground conditions.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

1.5 Assumptions

The following assumptions should be considered while reading this report:

- Resource consents and bore information available on GWRC's open data platform are current and reflect the existing groundwater and surface water users in the surrounding area.
- This report is based on communications and documents provided to the GHD hydrogeology and Geotechnical teams. If the design or construction methodology changes, further review and/or revision of this assessment may be required, which is outside the current scope of works.
- Dewatering is continuously undertaken while the excavation below the water table is open.

2. Environmental setting

2.1 General site setting

The proposed stormwater drainage trench (the site) is to be located along the western boundary of the current golf course. The site is within the boundaries of the Wellington International Airport; within 150m of the site are several car parks, hangars, commercial buildings, roads, pedestrian passes, and runways. 200m to the west of the site is undeveloped land being used as a golf course.

A topographic cross-section across the site is shown in Figure 2, showing a relatively flat slope from the site to Lyall Bay and a hill located to the east of the site.

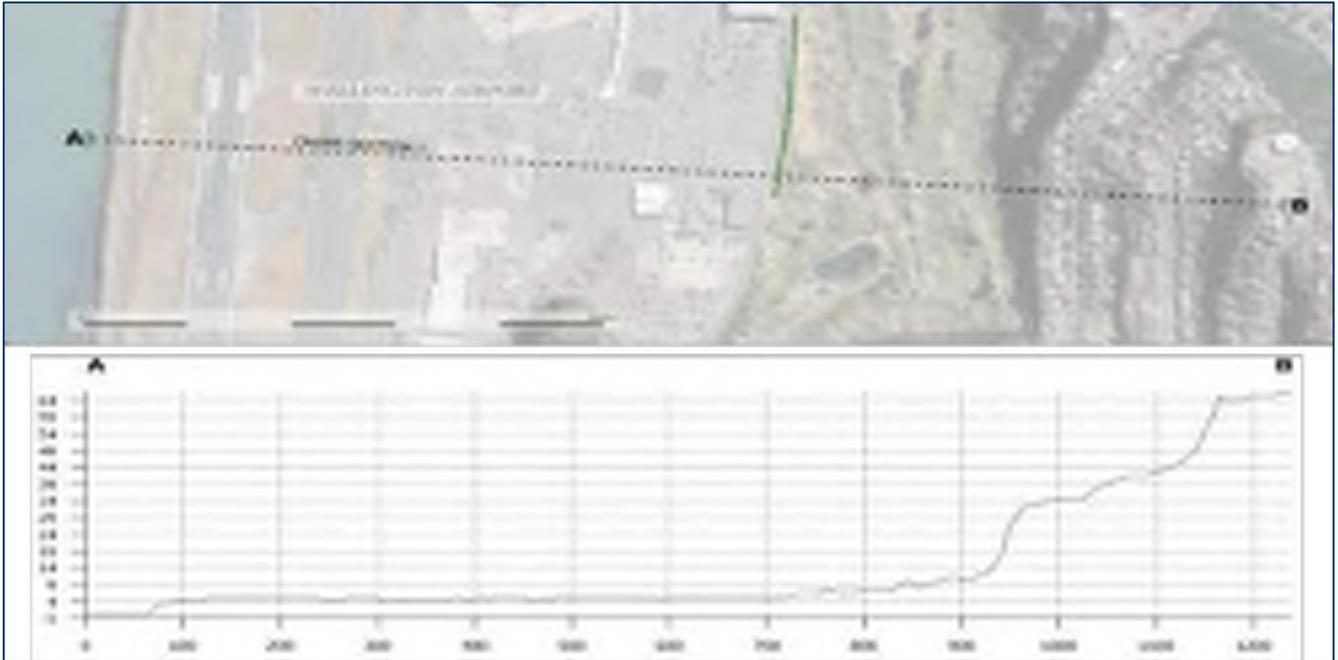


Figure 2 Cross section 1 and site topography.

2.2 Geological setting

The surficial geology, as mapped by Begg and Mazengarb (1996), from near the site is shown in Figure 3. The geological map shows Holocene aged marginal marine deposits (mostly beach sands), Pleistocene aged gravels and Triassic aged sandstone and argillite greywacke under the site, with two nearby faults (Begg and Mazengarb, 1996). The location of the contact between the marginal marine deposits and greywacke to the east of the site is certain.



Figure 3 Surficial geology (adapted from Begg and Mazengarb, 1996)

Based on multiple intrusive ground investigations undertaken in the general area the inferred ground conditions are:

- **Marginal marine sediments** (typically found between 0.5 to >15.45 m below ground level (bgl)): Medium dense to dense sands, with occasional lenses of gravel and silt.
- **Greywacke rock** (not encountered during any of the investigations, >15.45 m bgl).

2.3 Groundwater investigation

2.3.1 Groundwater levels

To determine the hydraulic connection between the identified wetland and the groundwater, two piezometers were installed. One piezometer was placed to the east of the wetland, while the other was positioned to the west. This strategic placement was chosen to monitor and compare the groundwater levels on both sides of the wetland.

Water level data loggers were installed on the 31/05/2024 and removed on the 6/06/2024. The data is presented in Figure 5 and Figure 6. This position of the loggers and the data collected was used to provide an insight into the groundwater's influence on the wetland and vice versa.



Figure 4 Location of piezometers and wetland.

2.3.2 Groundwater quality

A Preliminary Site Investigation (PSI) undertaken on the Miramar Links Golf Course in 2020³, was completed to identify the potential for the area to have been affected by contaminated land issues. The assessment identified that the golf course was subject to the historical use (1995 – 2019) of irrigation water sourced from the Moa Point wastewater treatment plant. The discharge from wastewater treatment plants is an identified potential source of per- and poly-fluoroalkyl substances (PFAS) contamination and therefore facilities that received wastewater may be potentially contaminated with PFAS⁴. E. Coli and other biological hazards were not considered contaminants of potential concern, as it is understood that the filtering and ultraviolet treatment of the wastewater before use on the course, limited the risk of biological contaminants being released on the golf course.

To provide an understanding of groundwater quality underlying the development area, samples were collected and analysed by an International Accreditation New Zealand (IANZ) accredited laboratory for PFAS. Sampling of both Piezometer 1 and 2 was initially attempted on 31 May. During the sampling Piezometer 1 became dry and did not recover during the event. As a consequence a sample was obtained from Piezometer 2 only. A second attempt to

³ GHD Limited, March 2020, Miramar Golf Course Preliminary Site Investigation

⁴ Heads of EPAs Australia and New Zealand (HEPA) 'PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020

sample Piezometer 1 was completed on 1 June, but again the well became dry and did not recover. As a consequence, a second sample from Piezometer 2 was collected on 1 June only.

The laboratory analysis of the collected groundwater is provided in Appendix B. The results reported the presence of low levels of PFAS in both samples collected. Concentrations were reported below the 95% species protection levels for aquatic ecosystems listed in the NEMP⁴ and below drinking water standards listed in the drinking water standards for New Zealand⁵. While low level concentrations were reported, the disposal options for extracted groundwater may be limited due to the presence of PFAS.

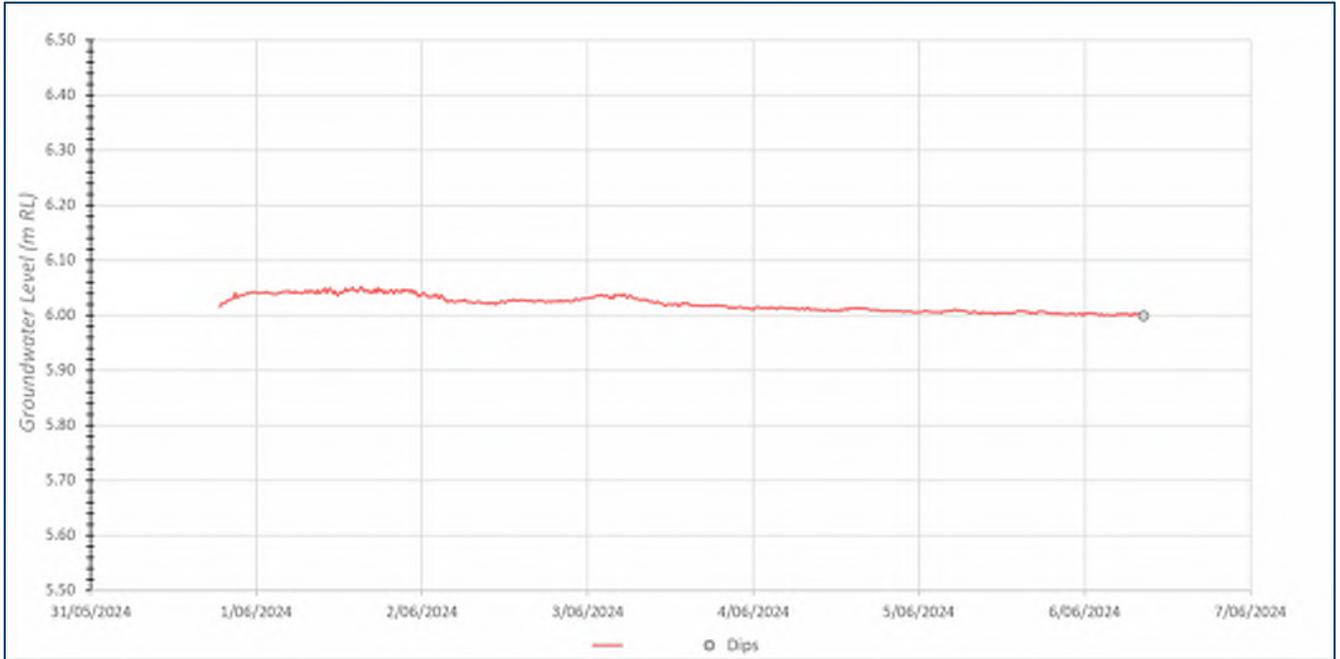


Figure 5 Groundwater levels in piezometer 1

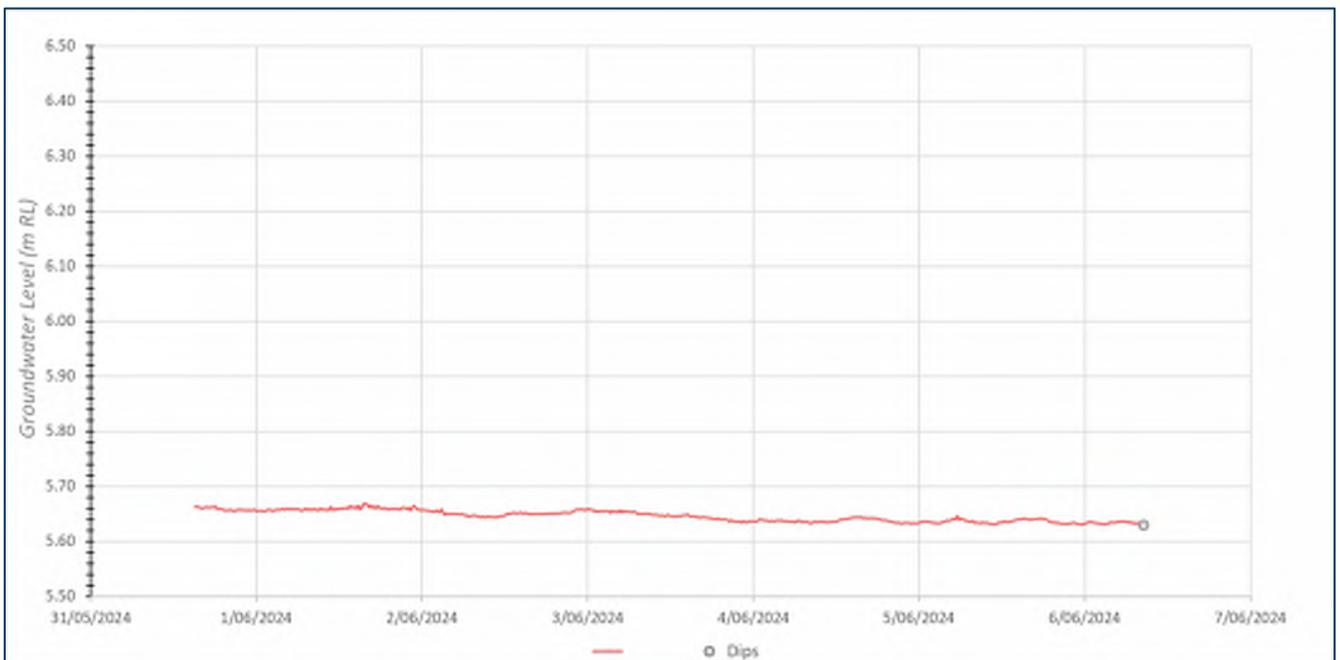


Figure 6 Groundwater levels in piezometer 2

⁵ Water Services (Drinking Water Standards for New Zealand) Regulations 2022

2.3.3 Groundwater flow

The geology of the site suggests an unconfined sandy aquifer, above greywacke rock. To the north of the site, geometry and location of the greywacke is uncertain. Unconfined groundwater typically follows topography, and the conceptual understanding of the site is that the inferred groundwater flow is towards Lyall Bay, with flow from east to west (Figure 7).

2.4 Hydrogeological conceptual site model

A hydrogeological conceptual site model was developed and is shown in Figure 7. The hydrogeological conceptual site model was developed based on the understanding of the environmental setting described in Section 2.1 and 2.2, and the groundwater data measured onsite (Section 2.3.1). Groundwater flow direction is expected to be west towards Lyall Bay.



Figure 7 Conceptual hydrogeological site model (Figure not to scale) (wastewater assets in red, proposed stormwater trench in pink)

3. Numerical Modelling

3.1 Introduction

Geostudio 2021 SEEP/W finite element numerical modelling software was used to create a groundwater model, which represented the intended construction and expected hydrogeological conditions to be encountered. This software is capable of simulating both unsaturated and saturated flow conditions that typically arise during dewatering of an excavation. The purpose of the analyses was to evaluate the potential scale and range of groundwater inflows and drawdowns that might arise due to dewatering activities associated with the construction of trenches needed for the installation of stormwater drainage. The computed groundwater drawdown and inflow rates were used to assess the effects of the proposed dewatering while also aiding in the estimation of settlement from dewatering during construction.

3.2 Model setup

Based on the proposed activity (Section 1.2), the construction of the stormwater drainage system will incorporate open trenching. One cross section was created as presented in Figure 7. The model cross-section was set up using topography from the LINZ Data Service (Wellington LiDAR 1 m DEM (2022-2023)), geological data collected at the completed bores drilled during the ground investigations, hydraulic properties, and groundwater levels recorded during various site investigation works. The cross section has been constructed to assess the impact of the proposed works (seen in green) on surrounding infrastructure (seen in red) and on an identified wetland nearby (seen in blue).

The proposed pipe alignment shown in Figure 7, and the analysis is outlined in Section 3.5. The construction works will be carried out by open trenching, with maximum excavation dimensions and time periods summarised in Table 1, Section 1.2 of this report. The location of the modelled cross-sections is shown in Figure 7, and the model setup, material properties and boundary conditions adopted into the models are detailed in Table 2.

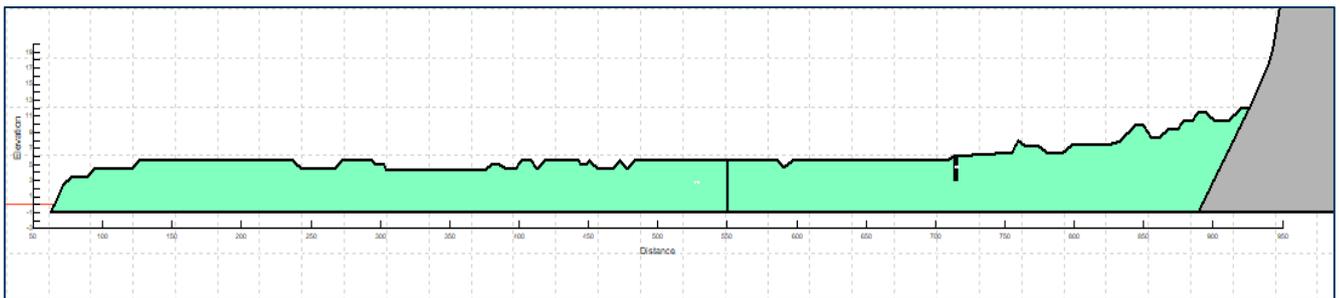


Figure 8 Model Cross -section

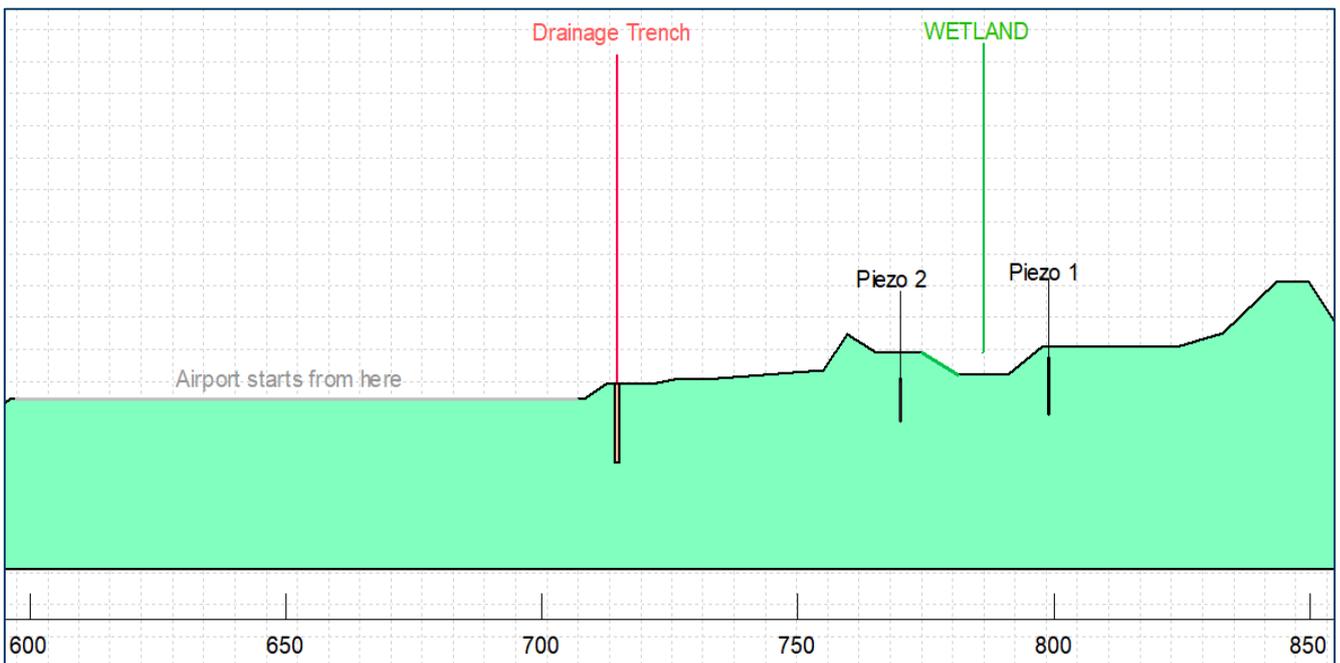


Figure 9 Model Cross section (600m to 850m)

Table 2 Model setup – Cross Section summary

Parameter	Adopted properties and values	Reference
Model type	Two-dimensional	-
Excavation dimensions	100m (long) x 1m (wide) x 3 m (deep) <i>(The trench is 300m long but will be done in 100m intervals)</i>	Adopted the values based on the design drawings (description of works provided in Section 1.4)
Dewatering period	18 days	Based on the estimated time for each 100m open excavation.
Water flux – Seepage face review	0 m pressure head	Simulates construction dewatering within the excavation.
Constant Head Boundary - Groundwater level	Ocean boundary – -0.19 m RL East model boundary – 6.2 m RL	Ocean level adopted from average previous 3 months of tidal recorded (MSL converted to DEM NZ2026 datum). Groundwater level at the model boundary is calibrated to the groundwater level measured in the piezometers (Section 2.3.1).
K-function	Marine Sediments – Sand	Selected from SEEP/W library based on material type
Saturated hydraulic conductivity of soils (Kx)	Marine Sediments – 1.2×10^{-06} m/s	The average value was found from all available results from hydraulic conductivity testing on the golf course.
Saturated water content and volumetric water content function	Marine Sediments - 0.39	Selected from SEEP/W library based on material type
Anisotropy (Ky/Kx)	Marine Sediments – 0.7	Considered appropriate for material type.

Modelling undertaken is considered conservative for the following reasons:

- The model was calibrated to the highest recorded groundwater level, which is considered a relatively conservative approach for a dewatering assessment.
- The deepest expected excavation depth was used in the model to assess the effects.
- No recharge was adopted into the model for the period of dewatering.
- Construction dewatering was considered for a conservative period of up to 18 days.
- A trench length of 100 m was adopted for scaling of 2D model groundwater inflow results, which represents the longest expected trench section between manholes.
- Conservative anisotropy values were adopted based on conceptual understanding of hydrogeological setting and properties.
- No recharge was adopted into the model; therefore, drawdown predictions are considered conservative.

3.3 Modelling approach

The groundwater model was developed to model the existing steady-state conditions (base model), followed by transient construction conditions (scenarios) for the proposed works. The model boundary for cross-section 1 was extended around 700 m west to the ocean and 180 m to the east (to the inferred Greywacke contact) to limit the boundary effect on groundwater flow conditions and results.

The base model was run as a steady-state analysis with the highest groundwater level recorded during monitoring. Following calibration, an open excavation was then modelled under transient conditions to reflect the construction of a void with a drain that intercepts the groundwater table. A potential seepage face boundary condition was applied to the excavation to simulate dewatering.

The cross-section was used to represent the excavation of a trench. For a conservative approach, drawdowns and total expected flows have been modelled using the maximum proposed depth.

3.4 Material properties

The horizontal hydraulic conductivity (K_H), anisotropy ($K_V:K_H$) and water content functions of the materials were selected based on what is considered appropriate for material type. As site specific hydraulic conductivity testing has not been undertaken data from previous analysis in the area was used⁶. Soakage testing in the area indicated that the hydraulic conductivity was between 2.3×10^{-5} m/s and 2.3×10^{-6} m/s. As the area around the wetland indicated finer materials a hydraulic conductivity of 2.3×10^{-6} m/s was used as the base case.

The applied anisotropy values were selected based on our understanding of the lithology and expected hydraulic movement through the applied material type and calibration results. Sensitivity analysis has been undertaken to better understand the effects on the results due to natural variation in ground conditions.

3.5 Sensitivity analysis and scenarios

Sensitivity analysis has been undertaken to estimate the variability in groundwater inflows and drawdown radius of influence that may result due to natural variations in ground conditions. Given the expected heterogeneity of the alluvial and marine deposits, there is likely to be localised variation in soil properties from those adopted in the model sections. It is also noted that not all materials encountered at the site were subject to aquifer parameter testing.

The marine sand deposit materials were considered the key parameters in the model that were likely to be sensitive to K_H (vertical hydraulic conductivity), due to the proposed construction being undertaken within these materials. The K_H was increased and decreased by an order of magnitude in order to assess the impact on groundwater flow and the extent of groundwater drawdown from the proposed construction activity. The results of the sensitivity analysis are presented in Table 3

Table 3 Sensitivity analysis summary

Scenario	Change form Base Case	K_H (m/s)
1	Base Case	1.2E-06
2	Increase by one order of magnitude	1.2E-05
3	Decrease by one order of magnitude	1.2E-07

3.6 Results

3.6.1 Groundwater drawdown and inflow rates

The modelled inflow rates and drawdowns for the model scenarios as described in Table 3 are summarised in Table 4. The estimated pit inflows and drawdown results are also plotted in Figure 10 and Figure 11 respectively.

Peak groundwater inflows to the excavation are likely to occur at the start of the works and decrease over time as groundwater levels reduce adjacent to the excavation. For any given scenario, drawdowns are greatest near the trench, reducing with distance away from the trench. When comparing the three scenarios the greatest drawdowns and inflows are for Scenario 2 which has the highest K_H .

⁶ PDP (2020). Miramar Golf Club development: Adventure Golf – Dewatering assessment.

Table 4 Inflows and drawdowns for the model scenarios

Scenario	Inflows after 0.25 days L/s (m3/d)	Inflows after 18 days L/s (m3/d)	Drawdown at wetland 65* m up-gradient of the trench after 18 days (m)
1 (Base Case)	< 1 (40)	< 1 (21)	0.0
2	4.6 (401)	< 1 (75)	0.06
3	< 1 (4)	< 1 (4)	0.0

*Minimum (closest) distance between the trench and the wetland.

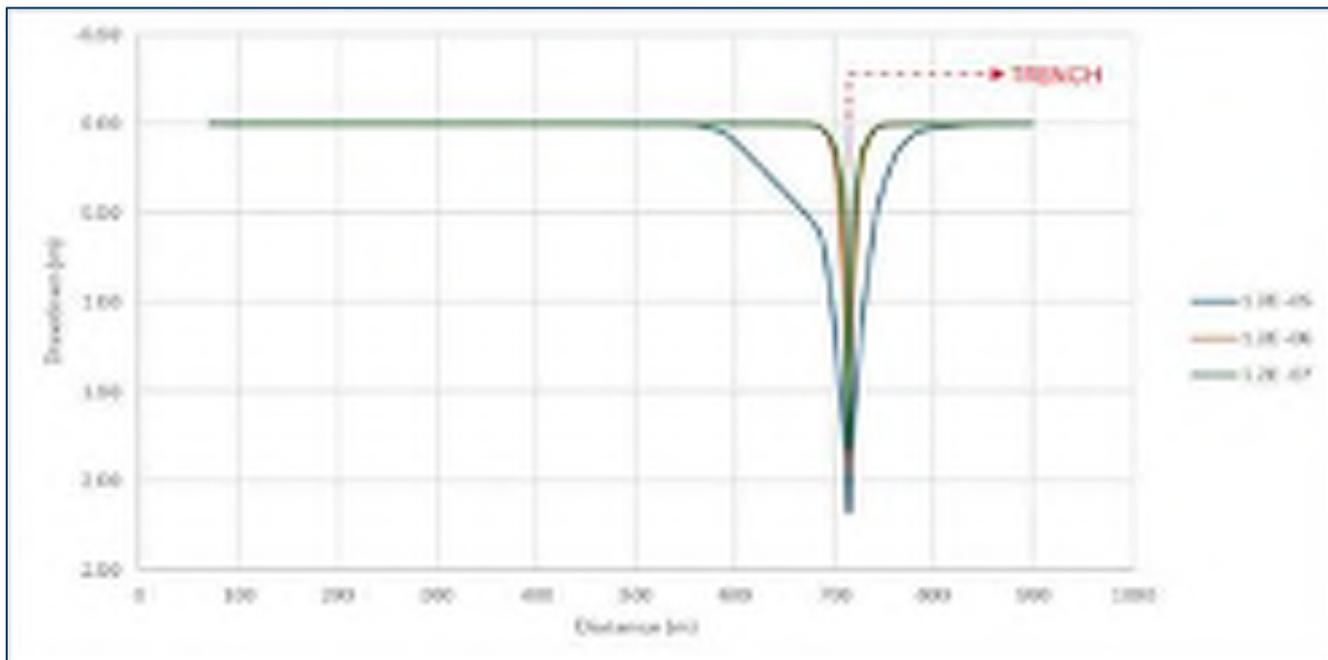
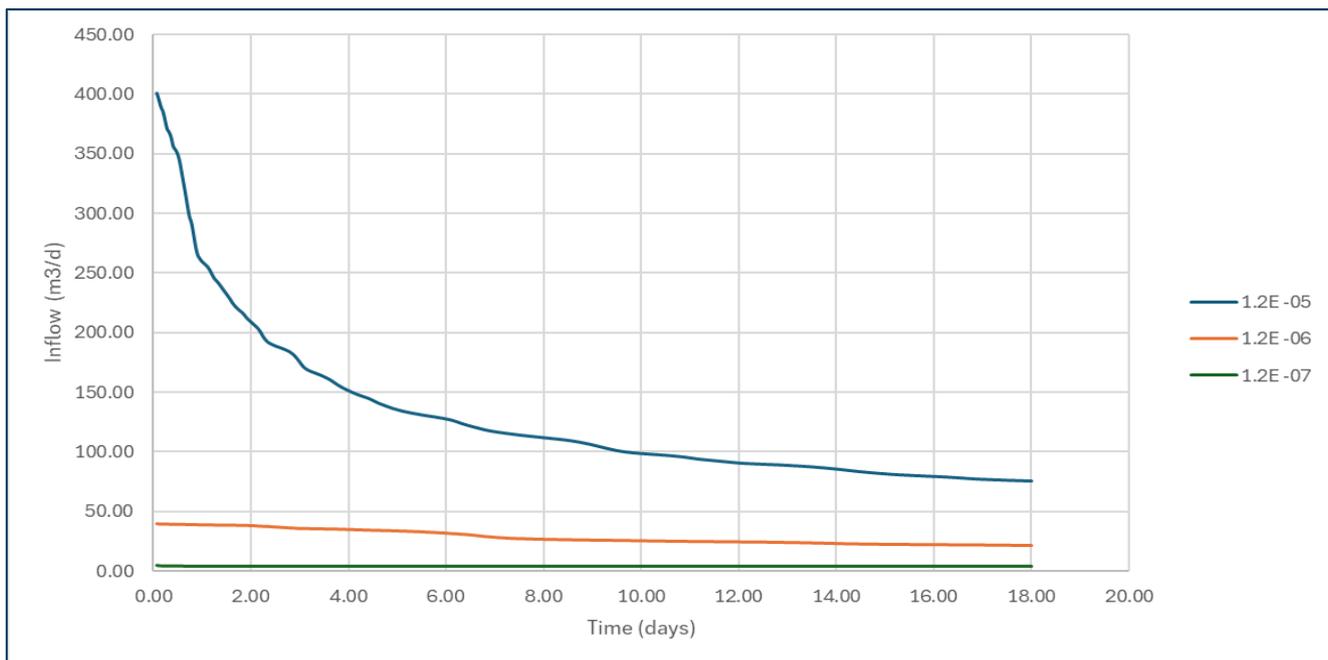


Figure 10 Drawdowns for modelled scenarios



3.6.2 Radius of Influence

A drawdown of 0.1m was used to define the radius of influence. For the three scenarios, the radius of influence from the centre of the trench alignment was determined. These values are presented in Table 5. Based on these distances the radius of influence was plotted using ArcGIS (Figure 12).

For all scenarios the radius of influence does not extend to the wetland boundary (Figure 12).

Table 5 Radius of influence for modelled scenarios

Scenario	Upgradient (Wetland)	Downgradient
1	33	19
2	56	114
3	30	17



Figure 12 Plan showing the modelled Radius of influence (expected drawdown from trench dewatering) (not in scale)

3.6.3 Drawdown Settlement

One dimensional vertical settlement has been estimated based on the groundwater drawdown curve and results provided in Figure 10 (Base case). The methodology followed is set out in Section 6.6.2 of CIRIA C750 (Preene, Roberts, & Powrie, 2016). The analysis has been carried out to assess the impacts of the dewatering on nearby structures. The structures nearby to the excavation include both a building, which has been assumed to have a shallow footing foundation located 20 m away from the excavation, and a sewer pipe embedded ~4 m below ground level (bgl) directly beneath the excavation.

Settlements derived are presented in Figure 13 and Figure 14, for both a shallow footing and sewer pipe respectively, without groundwater mitigation measures.

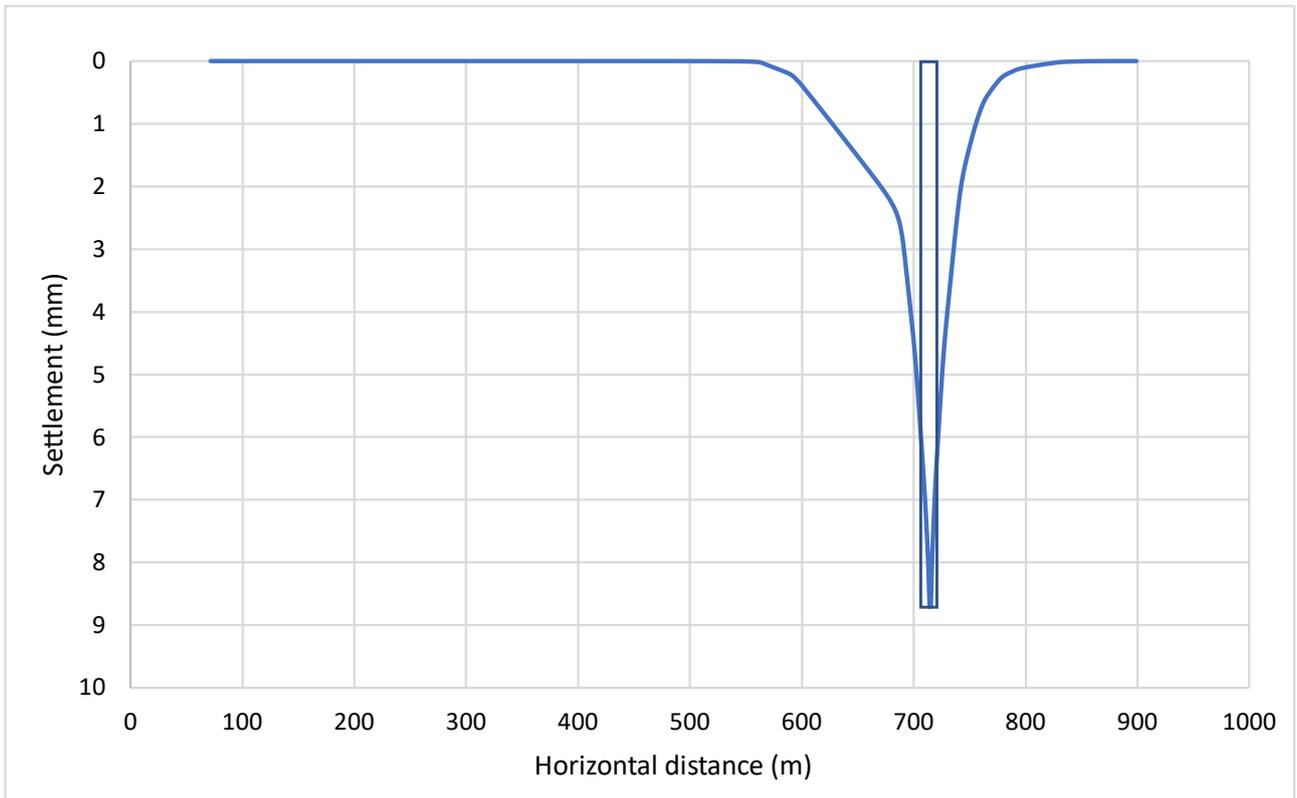


Figure 13 Dewatering induced settlement for a pipe structure

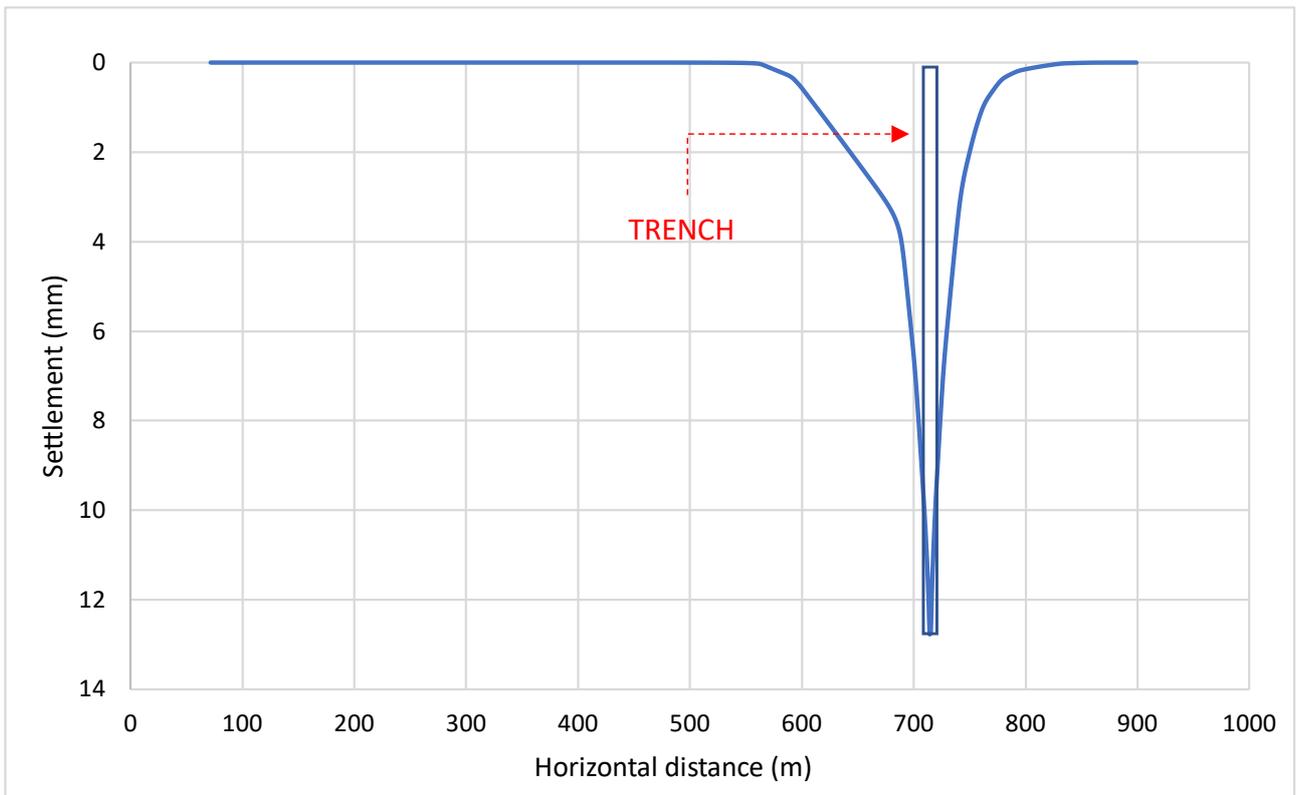


Figure 14 Dewatering induced settlement for a building with a shallow foundation

The horizontal axis on each figure indicates the distance on the horizontal cross-section presented in

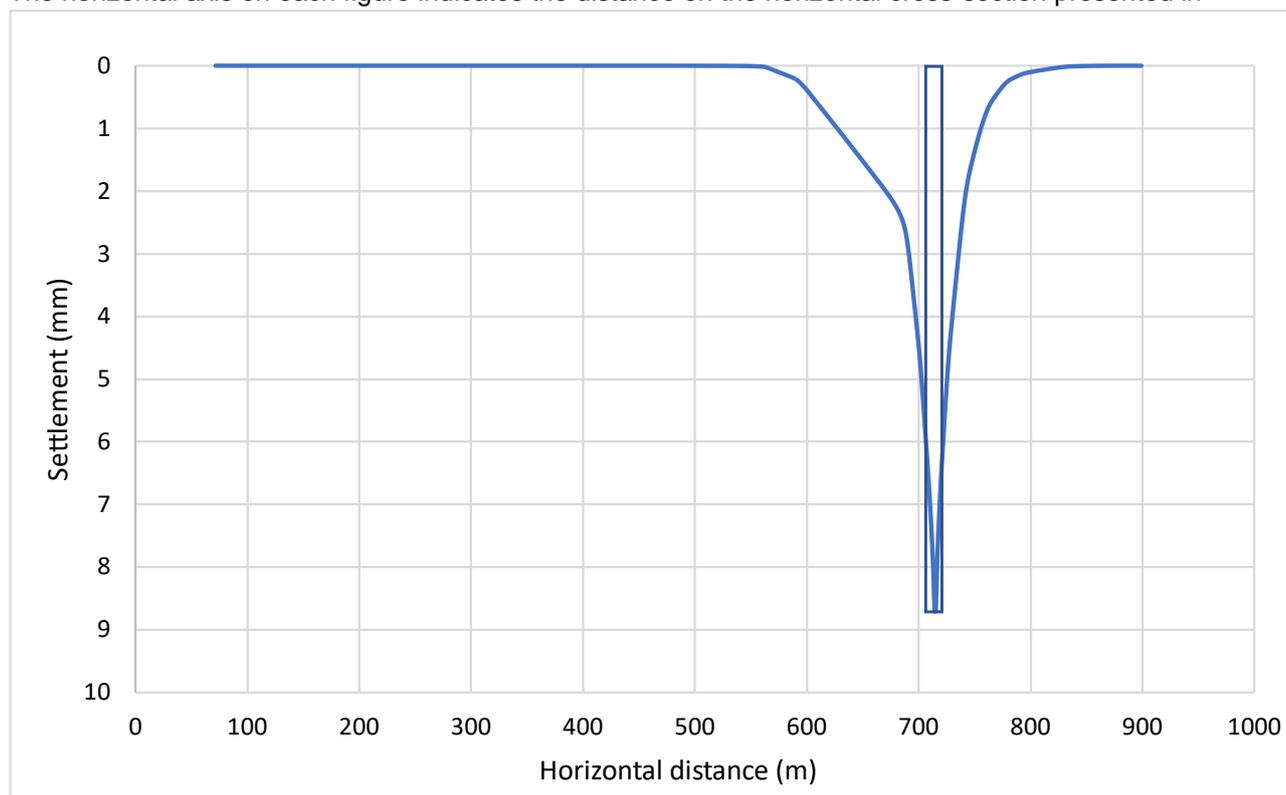


Figure 13 and Figure 14, where the excavation is located at chainage 714 m on the horizontal cross-section. These indicate that the maximum expected settlement adjacent to the excavation is likely to be approximately 9 mm for a pipe embedded at 4 m bgl and approximately 13 mm for a shallow footing. It is important to note that the results only represent the estimated settlements, which is a function of the general limitation associated with 1-dimensional consolidation settlement analysis. Settlement occurring because of contractor's methodology (mechanical settlement) has not been considered.

4. Assessment of effects

The modelling results have been used to assess the effects on surrounding natural features, water users, and the potential for dewatering induced settlement on existing utilities, and infrastructure.

4.1 Existing water users

Greater Wellington Regional Council's (GWRC) open data portal was used to identify existing water users surrounding the site. The GWRC resource consents (water use permits) as well as wells and bores layers were downloaded⁷. Information was also obtained from the New Zealand Geotechnical database (NZGD)⁸.

Within 100 meters of the trench, eight wells were identified from the NZGD, and three consents from the GWRC consents database. The eight wells are investigation well and do not have any water takes associated with them. Given the location and reticulated network. It is not expected that any of these wells will be used by unregistered users. Of the two consents one is a discharge consent and the other a surface water take permit. The surface water take permit is an expired permit to divert stormwater from a drain to irrigate a golf course.

⁷ Greater Wellington Regional Council. Wells and Bores. Downloaded June 2024 <https://data-gwrc.opendata.arcgis.com/>

⁸ New Zealand Geotechnical Database Accessed June 2024 <https://www.nzgd.org.nz/>

4.2 Surface water bodies

Except for the wetland which does not support surface water unless temporarily following heavy rainfall, no surface water bodies have been identified with 100m of the trench. Given the short duration of the pumping, the conservative assumptions, the radius of influence not extending to the wetland and no visible water on the surface of the wetland, the proposed works are unlikely to change the hydrological function of the wetland, or any local streams.

4.3 Potential for settlement of existing infrastructure

Dewatering of the excavation generally increases the effective stress in the soil, and this increase in effective stress can lead to settlement. Such settlement can damage nearby assets (infrastructure and buildings) if the foundation of those structures is not designed to tolerate the level of deformation arising.

The maximum expected settlement (due to dewatering) immediately adjacent to the excavation is estimated to be less than 10 mm for the embedded pipe 4 m bgl beneath a 2.5 m deep excavation. The maximum expected settlement (due to dewatering) immediately adjacent to the excavation is estimated to be 13 mm for a building, the closest building to this excavation is 20 m away, where the settlement is expected to be 5 mm. Settlement is not expected to be an issue and settlement monitoring is not considered necessary.

4.4 Long-term mounding

The effects on long-term mounding were not modelled. However, based on the conceptual understanding, the effects of the long-term structures (stormwater infrastructure and pipes) on groundwater levels are expected to be negligible due to the alignment being perpendicular to the direction of groundwater flow to the harbour, pipe diameter being small in comparison to the likely aquifer width, and relatively high permeabilities encountered at shallow depths. Groundwater levels are expected to flow around the structure and equilibrate to similar levels as they are currently measured.

5. Summary and conclusions

This report presents an assessment of effects from construction related dewatering. Previous ground investigations in the area have been used to identify the existing hydrogeological conditions (Section 2.3). Numerical modelling (Section 3) has been undertaken for the proposed excavation which is anticipated to intercept the groundwater table. Sampling of groundwater was also undertaken to understand groundwater quality.

- The modelled maximum inflow rates (start of dewatering) into the excavations is less than 1 l/s.
- Modelling has indicated that groundwater drawdown under all scenarios (including the maximum inflows above) is likely to occur, and some degree of settlement may occur as a result. As detailed in Section 3.6.3, less than 10 mm may be anticipated from the cross section analysed under conservative assumptions.
- Drawdown in the base case scenario with continuous dewatering is expected to be no more than 1.94 m at the trench edge and reduces to zero at 20 m from the trench.
- There are no existing consented users within 100 m of the works.
- Except for the identified wetland there are no surface water bodies within 100 m of the works.
- Low levels of PFAS concentrations are not expected to have any significant impact to the environment

The radius of influence for the works under the most conservative scenario is approximately 56 m from the proposed excavation and does not reach the wetland. Expected inflows are expected to be no more than 1 l/s after the initial pumping period. The overall activity is unlikely to change the hydrological function of the wetland, the environment or impact other users.

Low levels of PFAS were reported present in the groundwater. The source of PFAS present is expected to be the historic reuse of treated wastewater from the Moa Point wastewater treatment plant for irrigation purposes by the

Appendices

Appendix A

Detailed Design Drawings



**WIAL-UNCOVERED CARPARK
WELLINGTON**



Project 147103.30

Drawing Index

- C00-00 cover
- C00-01 drawing index and project notes
- C11-01 existing conditions plan
- C11-02 stage one existing conditions demolishing plan
- C20-01 stage one enabling earthworks contours and grading plan
- C21-01 stage one enabling earthworks cut fill and volumes plan
- C22-01 stage one enabling earthworks sections
- C30-01 stage one proposed surface finishes, final contours and levels plan
- C32-01 stage one sections
- C40-01 stage one proposed overall services plan
- C51-01 stage one proposed stormwater longitudinal sections
- C90-01 details
- C90-02 details
- C90-03 details
- C90-04 details
- C90-05 details
- C90-06 details
- C102-01 stage two road extension and profiles
- C103-01 stage two cross sections
- C102-01 stage two earthworks volumes plan

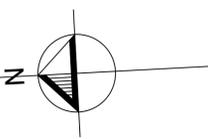
Project Notes

- 1 The contractor shall obtain all applicable codes, licenses, standards, specifications, etc. which are necessary to perform the proposed work at no additional cost to the owner.
- 2 Construction specifications have been issued with this project and must be used in conjunction with these drawings. Specifications take precedence over drawings if there is a discrepancy between them.
- 3 The contractor shall maintain one copy of the current and approved construction plans, specifications, resource consent and building consent at the job site at all times.
- 4 The contractor shall notify the Design Engineer immediately upon discovering any conflicts or other problems in conforming to the approved construction drawings, specifications or details for any element of the proposed improvements prior to proceeding with its construction.
- 5 Offsite and adjacent site data is for information purpose only.
- 6 Survey Information provided by Real Time Survey. Coordinates are in terms of NZGD 2000 Wellington Circuit. Levels are in terms of New Zealand Vertical Datum 2016.
- 7 Proposed site plan designed by Holmes NZ LP with input from the Client
- 8 Contractor shall reference "Miramar Golf Club Redevelopment" Geotechnical Report by PDP, dated 08/06/2023 as well as "WIAL Golf Course Carpark Investigation" by GHD, dated 28/02/2024.
- 9 Access to all adjacent properties and facilities shall be maintained at all times.
- 10 If hazardous material or suspect material is encountered the contractor shall notify the Client, Project Manager, and Design Engineer before continuing work.
- 11 All existing underground utility information (public and private) is indicative only and shown according to the best information available to the Design Engineer. The contractor shall contact all utility owners prior to beginning excavation or site grading. It shall be the contractor's responsibility for locating and protecting all utilities during construction and for coordinating with the appropriate utility company for any utility crossings required.
- 12 The contractor shall be responsible for the coordination of the installation or relocation of all utilities above and below grade (water, wastewater, stormwater, street lights, gas, electric, telecommunications, etc.).
- 13 Permission for any contractor or client proposed use, disturbance or access of offsite property, permanent or temporary, shall be obtained by the contractor in advance of the work.
- 14 The contractor shall provide written copy of any agreement or permit to use offsite property to the client prior to any use. The contractor shall not obligate the client to any stipulations unless the client becomes a party to the agreement.
- 15 Property boundaries shall be clearly indicated in order to delineate allowable limits of construction. No offsite disturbance allowed without adjacent property owner approval.
- 16 Boundary lines and easements indicated hereon reflect information proved by PDP. This plan may not include all information of record.
- 17 All work located within the road reserve shall be in accordance with the latest edition of the Wellington City Council Code of Practice.
- 18 All site work to be in accordance with the New Zealand Building Code and all other relevant standards.
- 19 All abandoned water, wastewater, and stormwater mains, manholes, stubs and accessories shall be abandoned per Wellington City Council specifications.
- 20 The contractor shall provide all required temporary traffic control in accordance with Council and NZTA standards.
- 21 Contractor shall be responsible for temporary erosion and sediment control during construction.
- 22 Contractor to check all set out dimensions and coordinate with the appropriate discipline.
- 23 Retaining walls designed by others.
- 24 Retaining wall elevations indicated are at the maximum wall height point of occurrence.
- 25 All landscaping and revegetation requirements by others.
- 26 All areas disturbed by construction and not paved at the completion of construction shall be reinstated to original conditions.
- 27 Dimensions shown on plans are horizontal distances as measured from centre of manhole to centre of manhole or from centre of waterline fitting to centre of fitting. These may vary due to field conditions.
- 28 Slope information provided for wastewater or stormwater pipe is calculated from centre of structure to centre of structure.
- 29 Existing water and wastewater service shutoffs shall be coordinated with existing customers and Council to minimize interruption of services.
- 30 Existing asphalt pavement shall be straight saw cut when access to underground utilities is required and to adjoin new asphalt pavement. Tack coat shall be applied to all exposed surfaces, including saw cuts, potholes, trenches and asphalt overlays. Refer to specification.
- 31 Contactor shall adjust lid levels of all manholes, valve covers, and rodding eyes to finished grade.

All dimensions to be verified on site before making any shop drawings or commencing any work

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B	22/03/2024	JXA	Detail design								
Rev	Date	Appd	Reason								



notes:

1. Refer to drawing C00-01 for project notes.
2. This drawing set contains colour. All reproduction to be in colour.

legend:

- Contours major (existing)
- Contours minor (existing)
- Site boundary (existing)
- Adjacent site boundary (existing)
- Wastewater MH (existing)
- Stormwater MH (existing)
- Stormwater sump (existing)
- Water meter (existing)
- Stormwater pipe (existing)
- Wastewater pipe (existing)
- Water pipe (existing)
- Power (existing)
- Irrigation lines (existing)
- Tree (existing)

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Sheet Title
existing conditions
plan

Drawn	DRL	Scale	1:400	(at A1)
Filename	147103.30 M-P-final levels.dwg			
Job No	147103.30	Sheet No	C11-01	Rev
				A



notes:

1. Refer to drawing C00-01 for project notes.
2. This drawing set contains colour. All reproduction to be in colour.

legend:

- Contours major (existing)
- Contours minor (existing)
- - - Site boundary (existing)
- - - Adjacent site boundary (existing)
- ⊗ Wastewater MH (existing)
- ⊗ Stormwater MH (existing)
- ⊗ Stormwater sump (existing)
- ⊗ Water meter (existing)
- ⊗ Stormwater pipe (existing)
- ⊗ Wastewater pipe (existing)
- ⊗ Water pipe (existing)
- ⊗ Power (existing)
- ⊗ Irrigation lines (existing)
- ⊗ End cap (proposed)
- x - x - x - Demolish existing services
- ⊗ Sump to be removed
- ⊗ Tree to be removed

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WELLINGTON

Sheet Title
stage one
existing conditions
demolishing plan

Drawn	DRL	Scale	1:400	(at A1)
Filename	147103.30 M-P-final levels.dwg			
Job No	Sheet No	Rev		
147103.30	C11-02	A		



notes:

1. Refer to drawing C00-01 for project notes.
2. This drawing set contains colour. All reproduction to be in colour.

legend:

- Contours major (existing)
- Contours minor (existing)
- Contours major (proposed)
- Contours minor (proposed)
- Site boundary (existing)
- Adjacent site boundary (existing)
- Asphalt Traffic surface (Proposed)
- Concrete footpath (proposed)
- Landscaped areas, refer to Landscape Architect for details.
- Parking lines (Proposed)
- Parking numbers (Proposed)
- Parking bay lines (Proposed)
- Earthworks (-gravity fall) -10:0:1
- Fence (proposed) refer to detail on C90-05

All dimensions to be verified on site before making any shop drawings or commencing any work

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WELLINGTON

Sheet Title

stage one
enabling earthworks contours
and grading plan

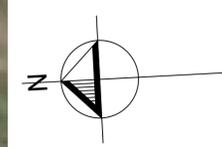
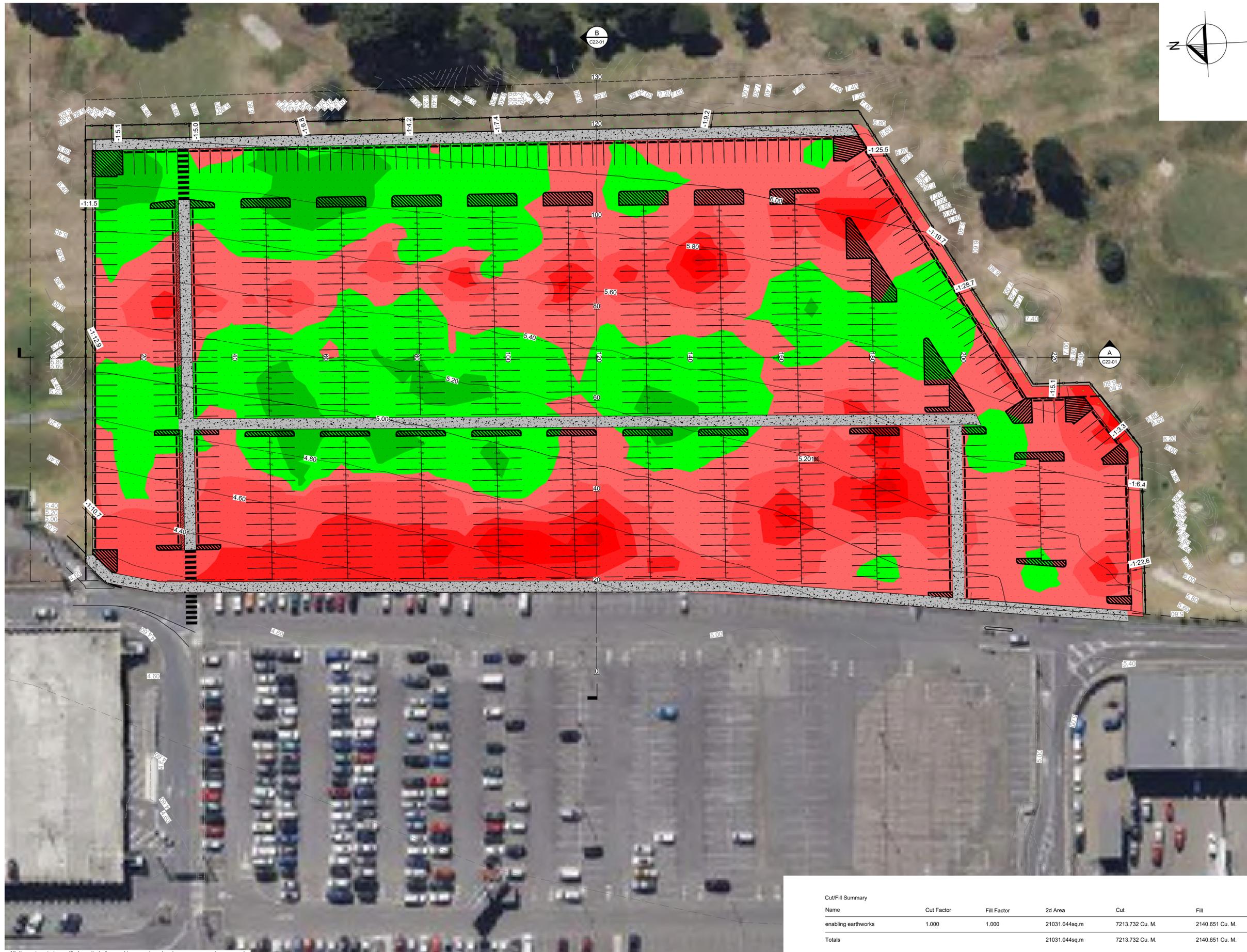
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Filename 147103.30 M-P-Earthworks.dwg

Job No Sheet No Rev

147103.30 C20-01

A



- notes:
1. Refer to drawing C00-01 for project notes.
 2. This drawing set contains colour. All reproduction to be in colour.
 3. Earthworks volumes based off final design levels -0.37m pavement build up.

- legend:
- Contours major (existing)
 - Contours minor (existing)
 - Contours major (proposed)
 - Contours minor (proposed)
 - Site boundary (existing)
 - Adjacent site boundary (existing)
 - Asphalt Traffic surface (Proposed)
 - Concrete footpath (proposed)
 - Landscaped areas, refer to Landscape Architect for details.
 - Parking lines (Proposed)
 - Parking numbers (Proposed)
 - Parking bay lines (Proposed)
 - Earthworks (-gravity fall)
 - Fence (proposed) refer to detail on C90-05

Surface Analysis: Elevation Ranges			
Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1	Dark Red	-3.838	-2.500
2	Red	-2.500	-2.000
3	Light Red	-2.000	-1.500
4	Very Light Red	-1.500	-1.000
5	Lightest Red	-1.000	-0.500
6	Lightest Red	-0.500	0.000
7	Light Green	0.000	0.500
8	Dark Green	0.500	1.000

Cut/Fill Summary						
Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
enabling earthworks	1.000	1.000	21031.044sq.m	7213.732 Cu. M.	2140.651 Cu. M.	5073.080 Cu. M.<Cut>
Totals			21031.044sq.m	7213.732 Cu. M.	2140.651 Cu. M.	5073.080 Cu. M.<Cut>

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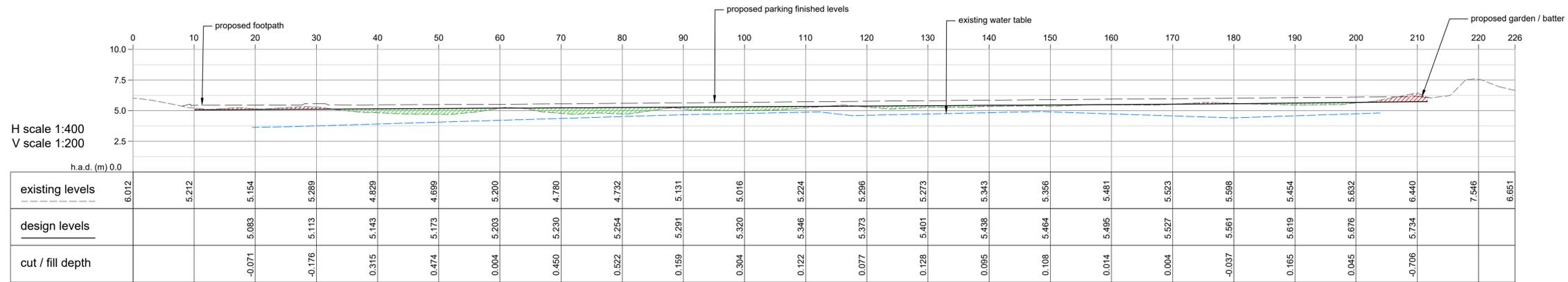
Sheet Title
**stage one
enabling earthworks cut fill
and volumes plan**

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Filename	147103.30 M-P-Earthworks.dwg			
Job No	Sheet No	Rev		
147103.30	C21-01	B		

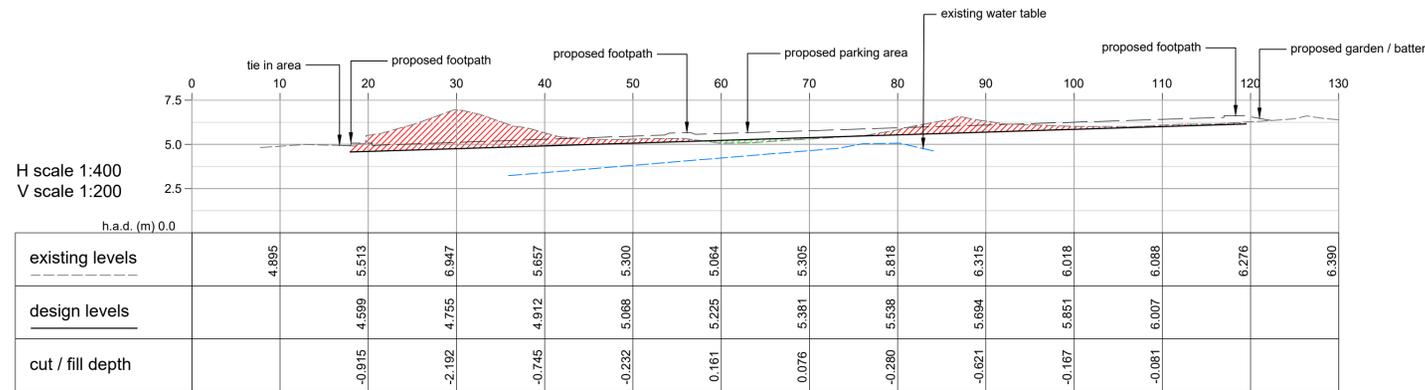
notes:

1. Refer to drawing C00-01 for project notes.
2.  This drawing set contains colour. All reproduction to be in colour.

legend:



A - cross section



B - cross section

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Rev	Date	Appd	Reason

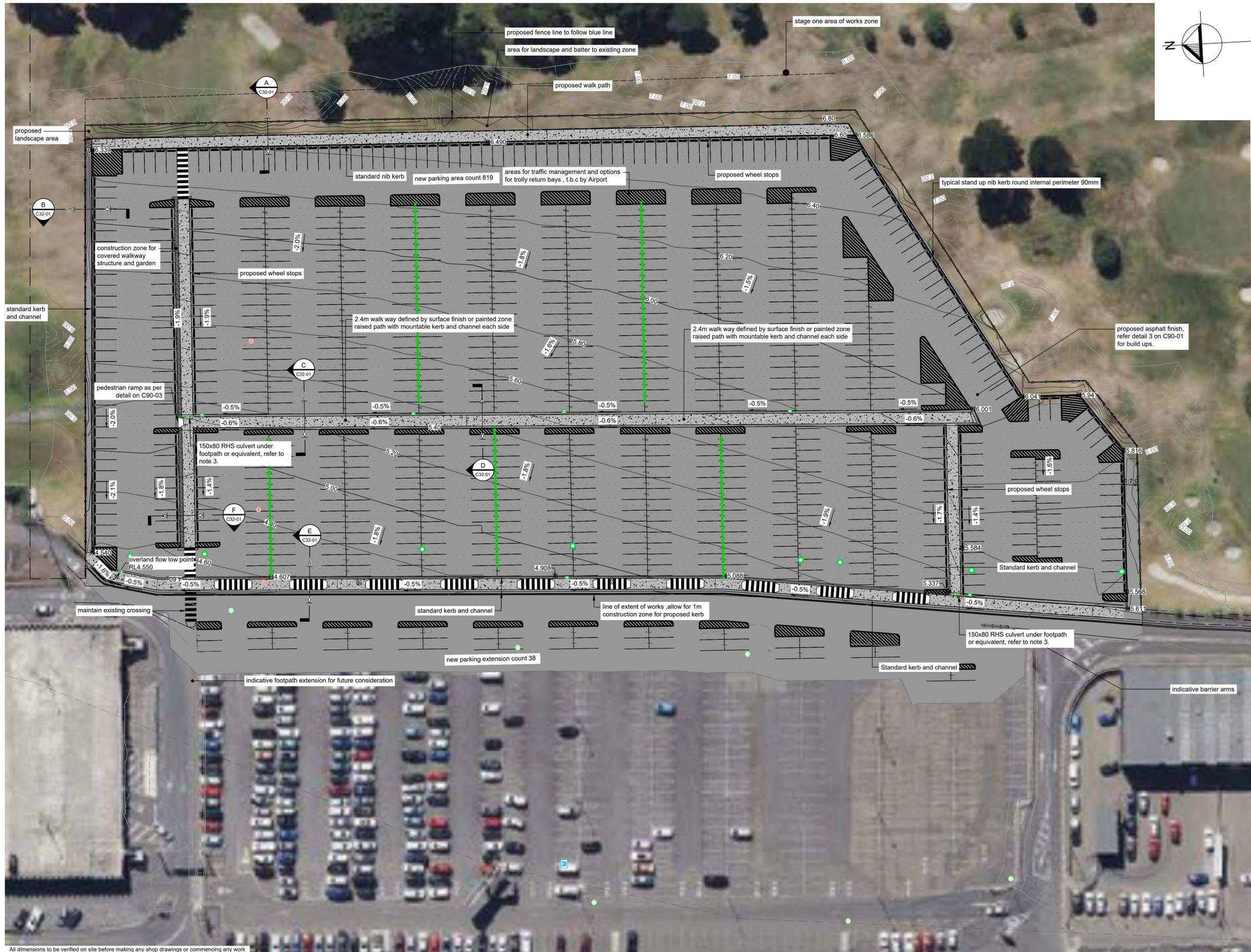


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WELLINGTON

Sheet Title
stage one
enabling earthworks sections

Drawn	DRL	Scale	as shown	(at A1)
Filename	147103.30 M-P-Earthworks.dwg			
Job No	Sheet No	Rev		
147103.30	C22-01	B		



- notes:**
1. Refer to drawing C00-01 for project notes.
 2. This drawing set contains colour. All reproduction to be in colour.
 3. Refer C90-03 for Standard kerb and channel detail, Standard mountable kerb and channel detail, and Standard nib kerb detail.
 4. Install a 150x80mm galvanised RHS under pedestrian walkway to ensure flowline of kerb & channel is continued for overland flow.

- legend:**
- Contours major (existing)
 - Contours minor (existing)
 - Contours major (proposed)
 - Contours minor (proposed)
 - Site boundary (existing)
 - Adjacent site boundary (existing)
 - 3.6% → Trafficable surfaces (-gravity fall)
 - ⊗ 56.000 Spot height (design surface)
 - Stormwater MH (proposed)
 - Concrete channel drain (Proposed)
 - SW Standard back entry double sump (proposed), refer C90-02 for detail
 - Wastewater MH (existing)
 - Stormwater MH (existing)
 - Stormwater sump (existing)
 - Water meter (existing)
 - Asphalt Traffic surface (Proposed)
 - Concrete footpath (proposed)
 - Landscaped areas, refer to Landscape Architect for details.
 - Parking lines (Proposed)
 - Parking numbers (Proposed)
 - Parking bay lines (Proposed)
 - Pedestrian crossing (Proposed) refer C90-03 for details

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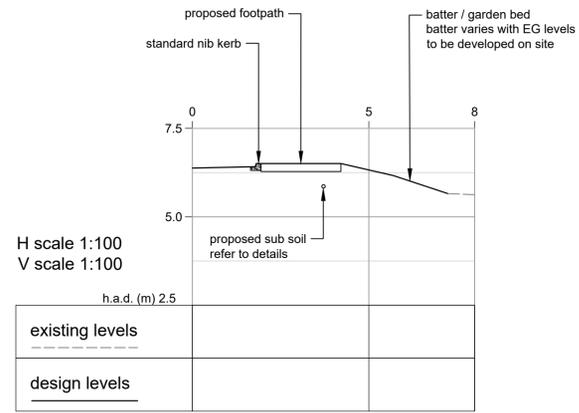
**WIAL-UNCOVERED CARPARK
WELLINGTON**

Sheet Title
**stage one
proposed surface finishes
final contours and levels plan**

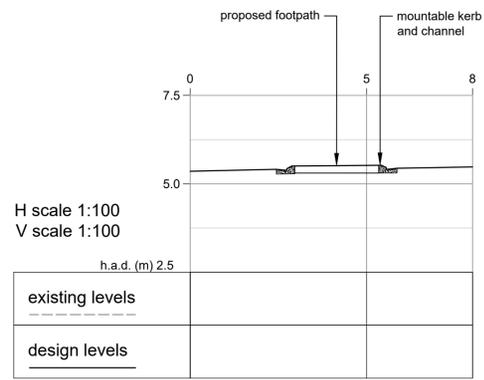
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Job No	Sheet No	Rev		
147103.30	C30-01	B		

notes:

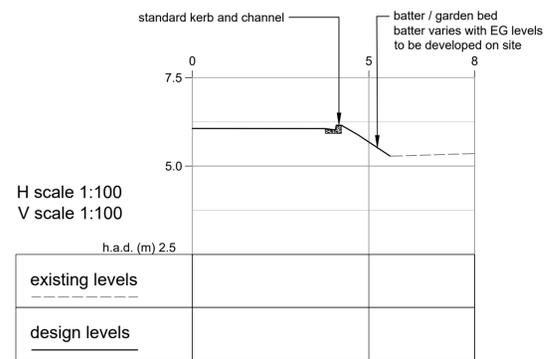
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2.  This drawing set contains colour. All reproduction to be in colour.



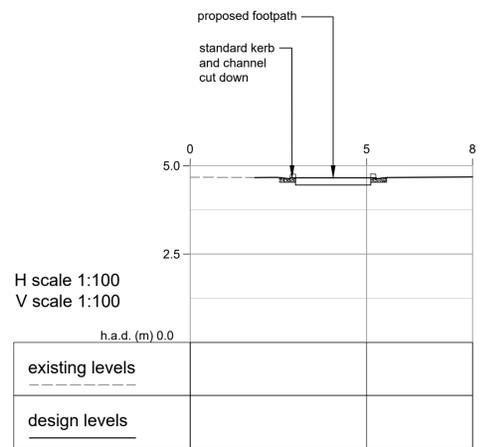
A - cross section



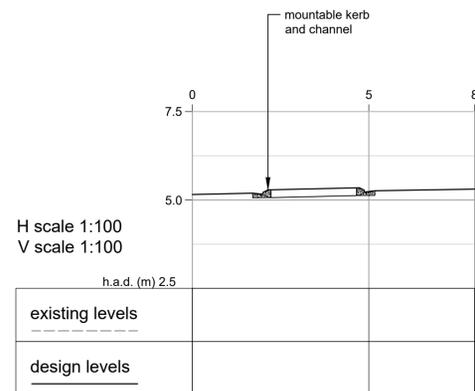
D - cross section



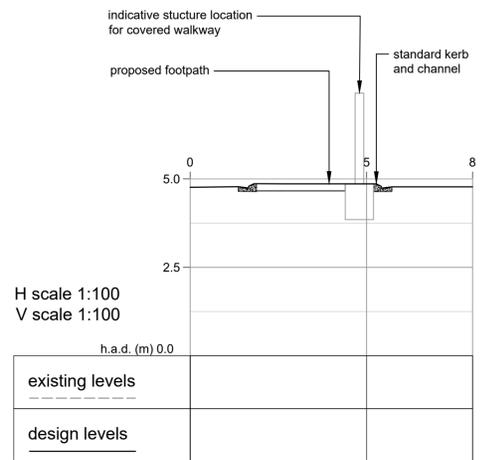
B - cross section



E - cross section



C - cross section



F - cross section

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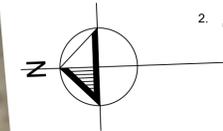
WIAL-UNCOVERED CARPARK
WELLINGTON

Sheet Title
stage one
sections

Drawn	DRL	Scale	as shown	(at A1)
Filename	147103.30 M-P-final levels.dwg			
Job No	Sheet No	Rev		
147103.30	C32-01	A		

notes:

1. Refer to drawing C00-01 for project notes.
2. This drawing set contains colour. All reproduction to be in colour.



legend:

- Site boundary (existing)
- Adjacent site boundary (existing)
- Wastewater MH (existing)
- Wastewater MH (proposed)
- Stormwater MH (existing)
- Stormwater MH (proposed)
- Stormwater sump (existing)
- Stormwater MH (proposed)
- SW Standard back entry double sump (proposed), refer C90-02 for detail
- Fire hydrant (existing)
- Backflow preventer (existing)
- Stormwater pipe (existing)
- Wastewater pipe (existing)
- Water pipe (existing)
- Power (existing)
- Stormwater pipe (proposed)
- 1000 subsoil (proposed) Refer C90-03 for details.
- Overland flow path (proposed)
- Overland flow path (existing)
- Irrigation lines (existing)
- SW360 treatment device, refer to STORMWATER360 for details



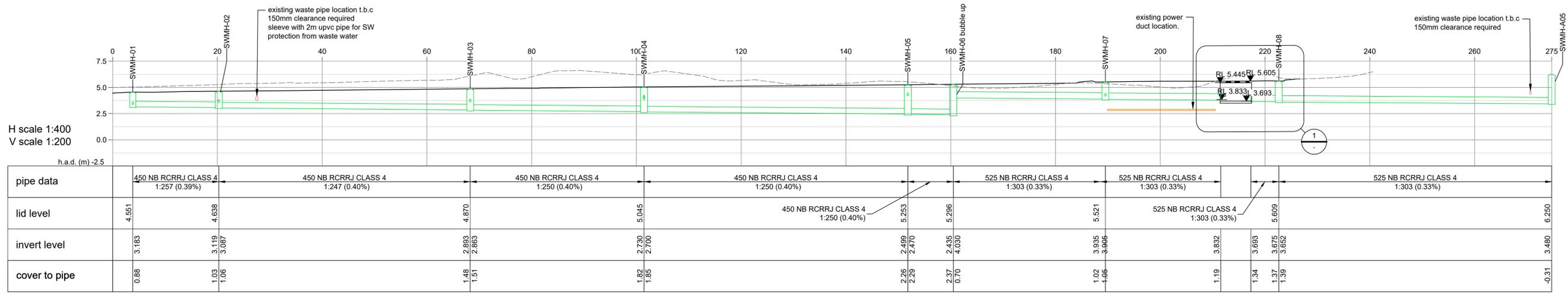
All dimensions to be verified on site before making any shop drawings or commencing any work

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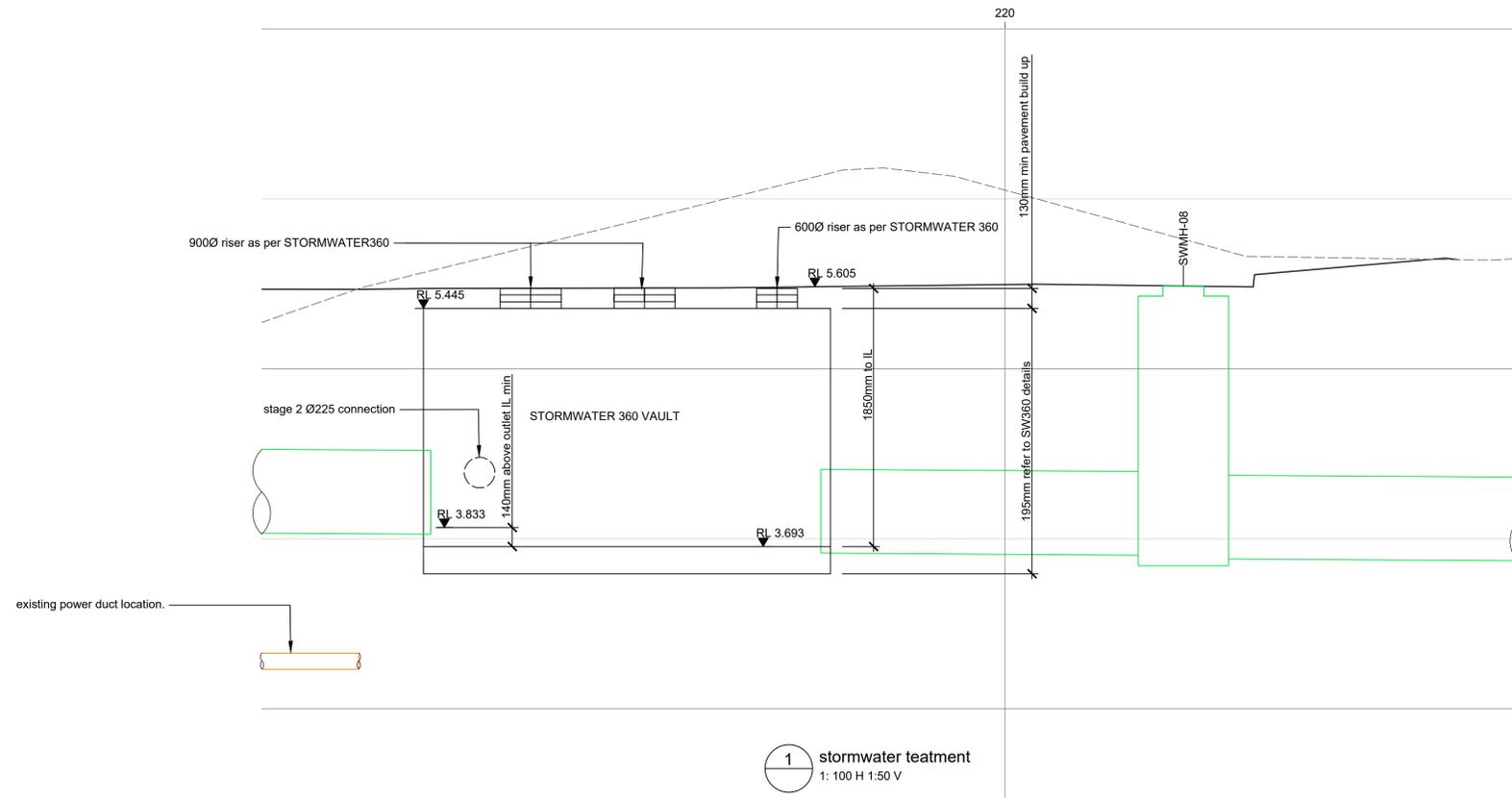
Consultants				<p>Holmes NZ LP 469 Grey Street Hamilton 3216 New Zealand holmesanz.com T: +64 7 856 4849</p>	<p>WIAL-UNCOVERED CARPARK WELLINGTON</p>	Sheet Title		Drawn	DRL	Scale	1:400	(at A1)
						stage one proposed overall services plan		Filename	147103.30 M-P-Services.dwg		Job No	Sheet No
B	22/03/2024	JXA	Detail design					147103.30 C40-01		B		
Rev	Date	Appd	Reason									

notes:

1. Refer to drawing C00-01 for project notes.
2.  This drawing set contains colour. All reproduction to be in colour.



SW 01 - longitudinal section



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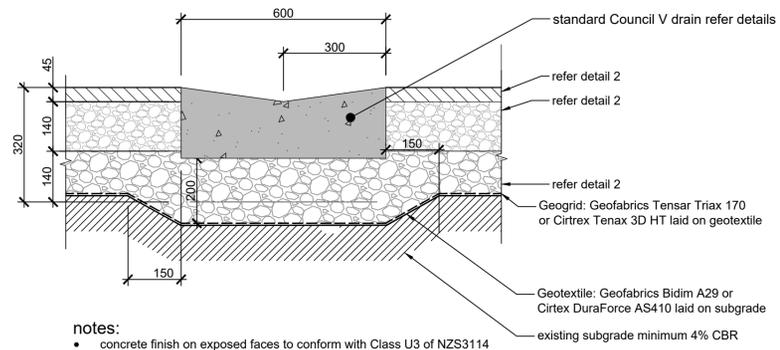
WIAL-UNCOVERED CARPARK
WELLINGTON

Sheet Title
stage one
proposed stormwater
longitudinal sections

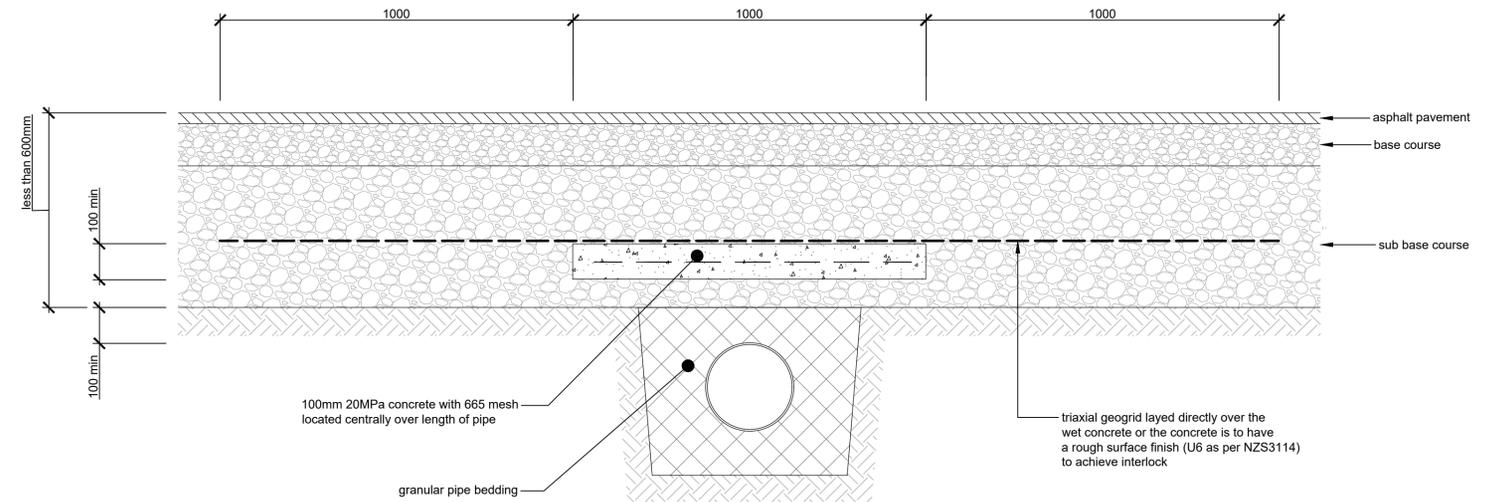
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Job No	Sheet No	Rev		
147103.30 C51-01		B		

notes:

- Refer to drawing C00-01 for project notes.
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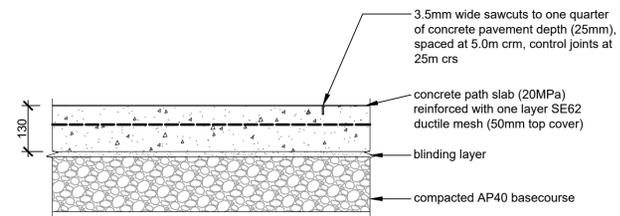


1 Cast in situ concrete V-drain
1: 10



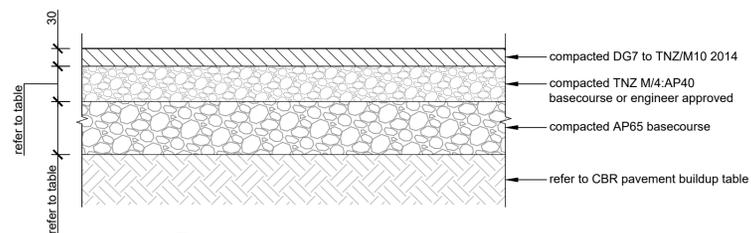
2 concrete capping detail
1: 10

AC Pavement Buildup Table				
AC and Sub-base thickness (mm)				
	CBR (4%)	CBR (7%)	CBR (10%)	CBR (15%)
DG7	30	30	30	30
AP40	140	140	260	220
AP65	320	200		

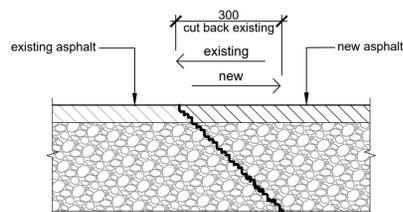


6 typical concrete footpath
1: 10

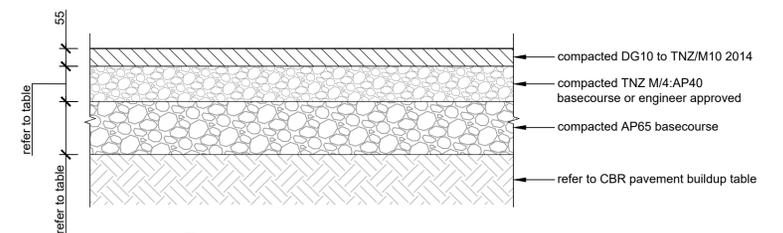
Heavy Vehicle Trafficable AC Pavement Buildup Table			
AC and Sub-base thickness (mm)			
	CBR (4%)	CBR (7%)	CBR (>7%)
DG10	55	55	55
AP40	160	160	160
AP65	380	220	200



3 typical asphalt build up
1: 10



4 typical asphalt tie-in detail
1: 10



5 typical build up for road widening - stage 2
1: 10

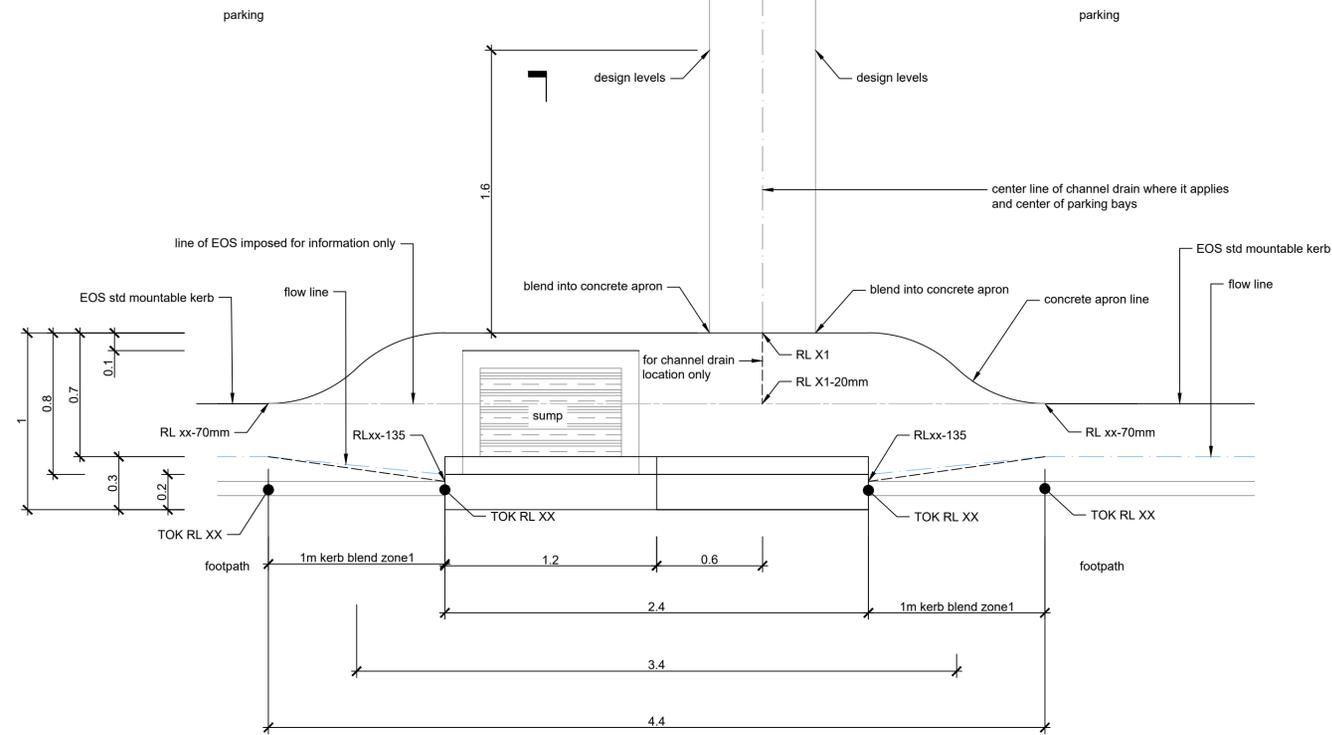
All dimensions to be verified on site before making any shop drawings or commencing any work

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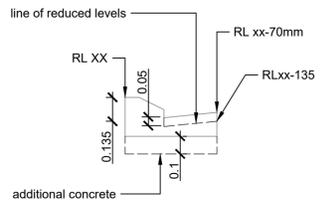
Consultants				<p>Holmes NZ LP 469 Grey Street Hamilton 3216 New Zealand holmesanz.com T: +64 7 856 4849</p>	<p>WIAL-UNCOVERED CARPARK WELLINGTON</p>	Sheet Title		Drawn DRL Scale as shown (at A1)	
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						Job No		Sheet No	
						147103.30 C90-01		Rev	
								A	

notes:

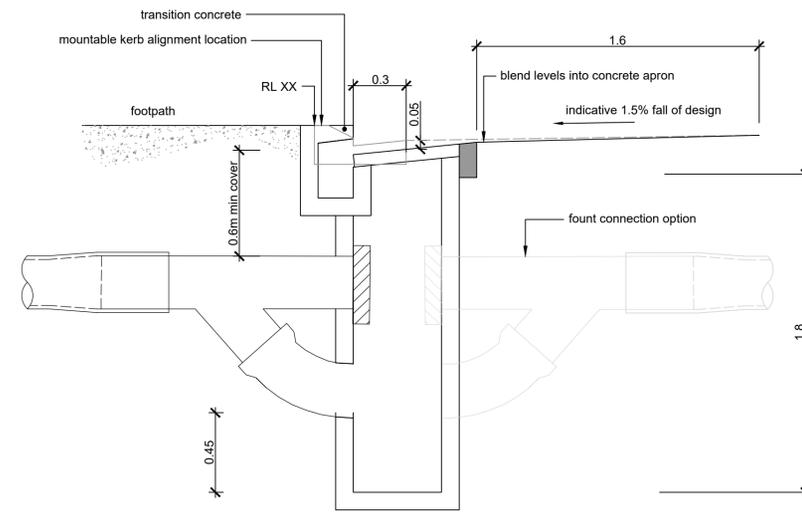
1. Refer to drawing C00-01 for project notes.
2. This drawing set contains colour. All reproduction to be in colour.
3. Refer to HUMES for MAX PIT product details.



1 HUMES MAX PIT plan view
1:20



1a kerb set out
n.t.s



1a section view
1:20

Acceptable Solution E1/AS1

Amend 1
Sep 1993

Figure 9: Type-two Surface Water Sump
Paragraph 3.3.2

SECTION

38

September 1999

DEPARTMENT OF BUILDING AND HOUSING

All dimensions to be verified on site before making any shop drawings or commencing any work

Rev	Date	Appd	Reason
A	22/03/2024	JA	Detail design

Consultants	
-------------	--



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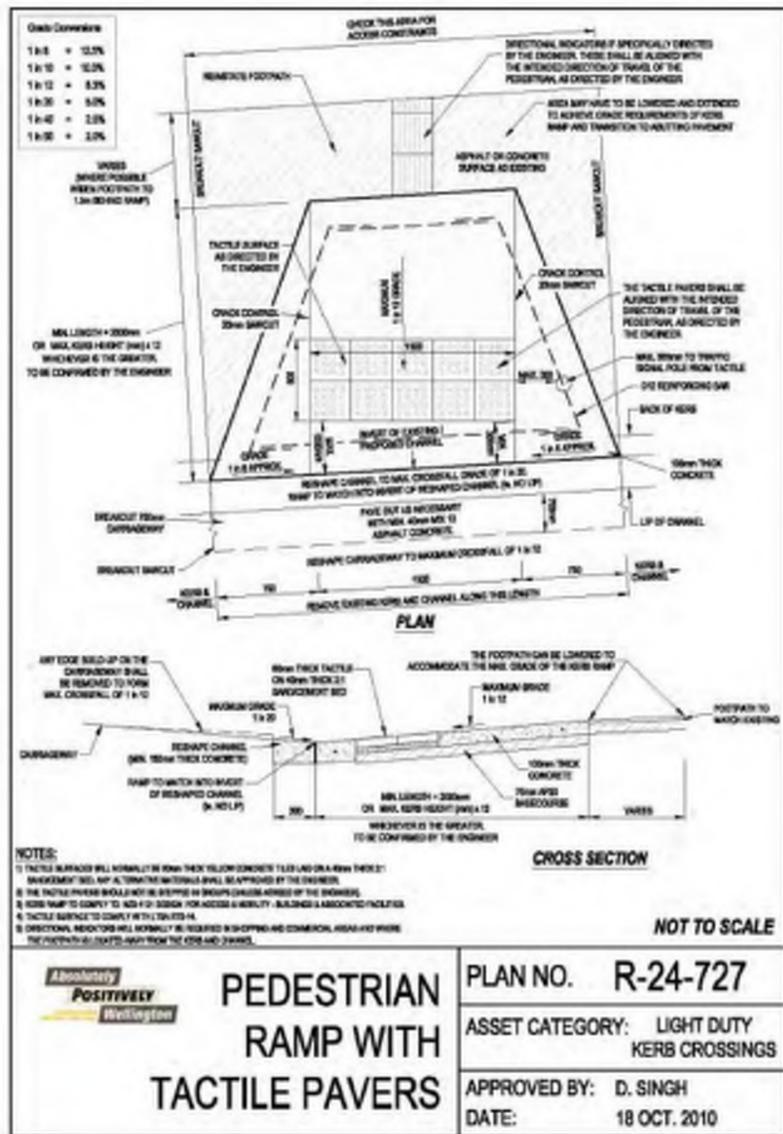
WIAL-UNCOVERED CARPARK
WELLINGTON

Sheet Title
details

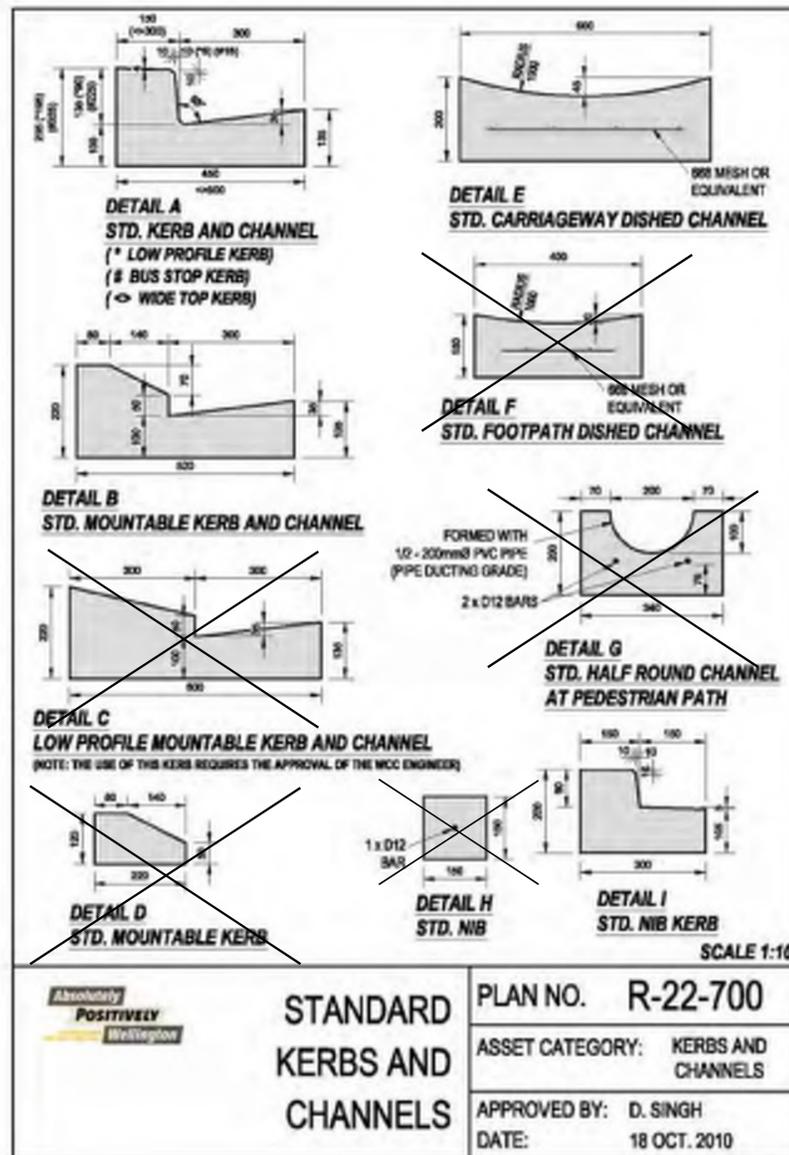
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Job No	147103.30	Sheet No	C90-02	Rev
				A

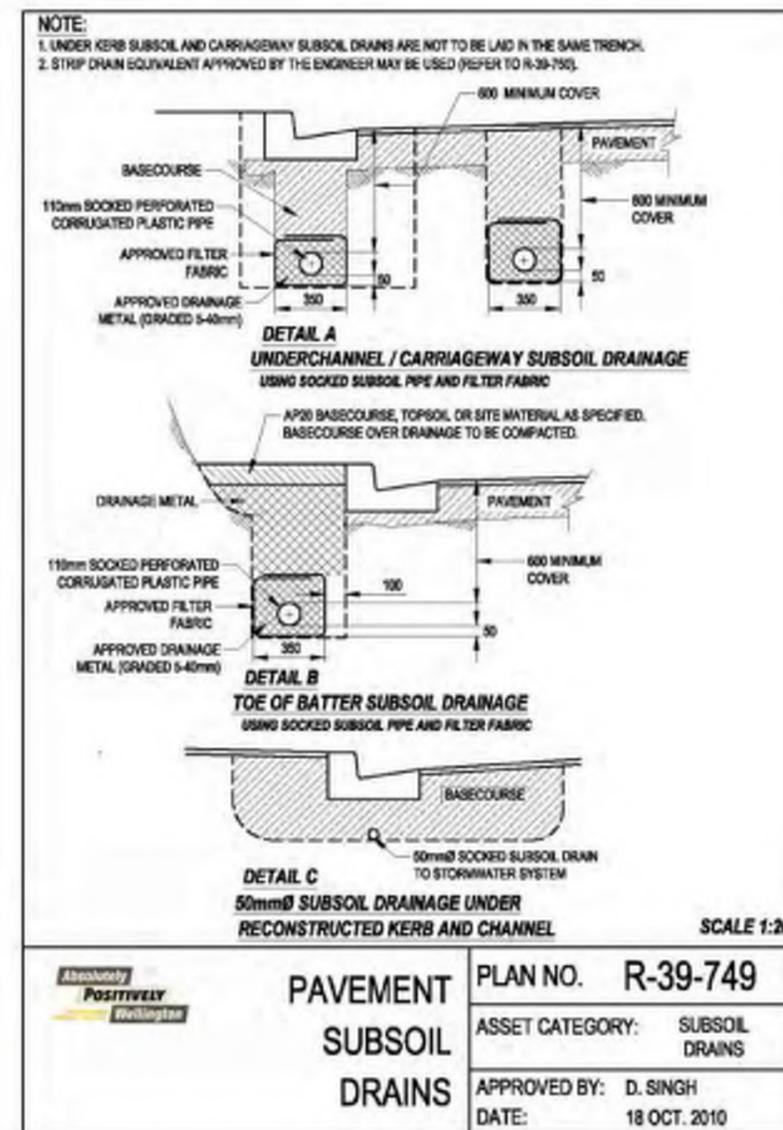
Drwg R-24-727 Pedestrian Ramp with Tactile Pavers



Drwg R-22-700 Standard Kerbs and Channels



Drwg R-39-749 Pavement Subsoil Drains



notes:

- Refer to drawing C00-01 for project notes.
- This drawing set contains colour. All reproduction to be in colour.

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A	22/03/2024	JA	Detail design



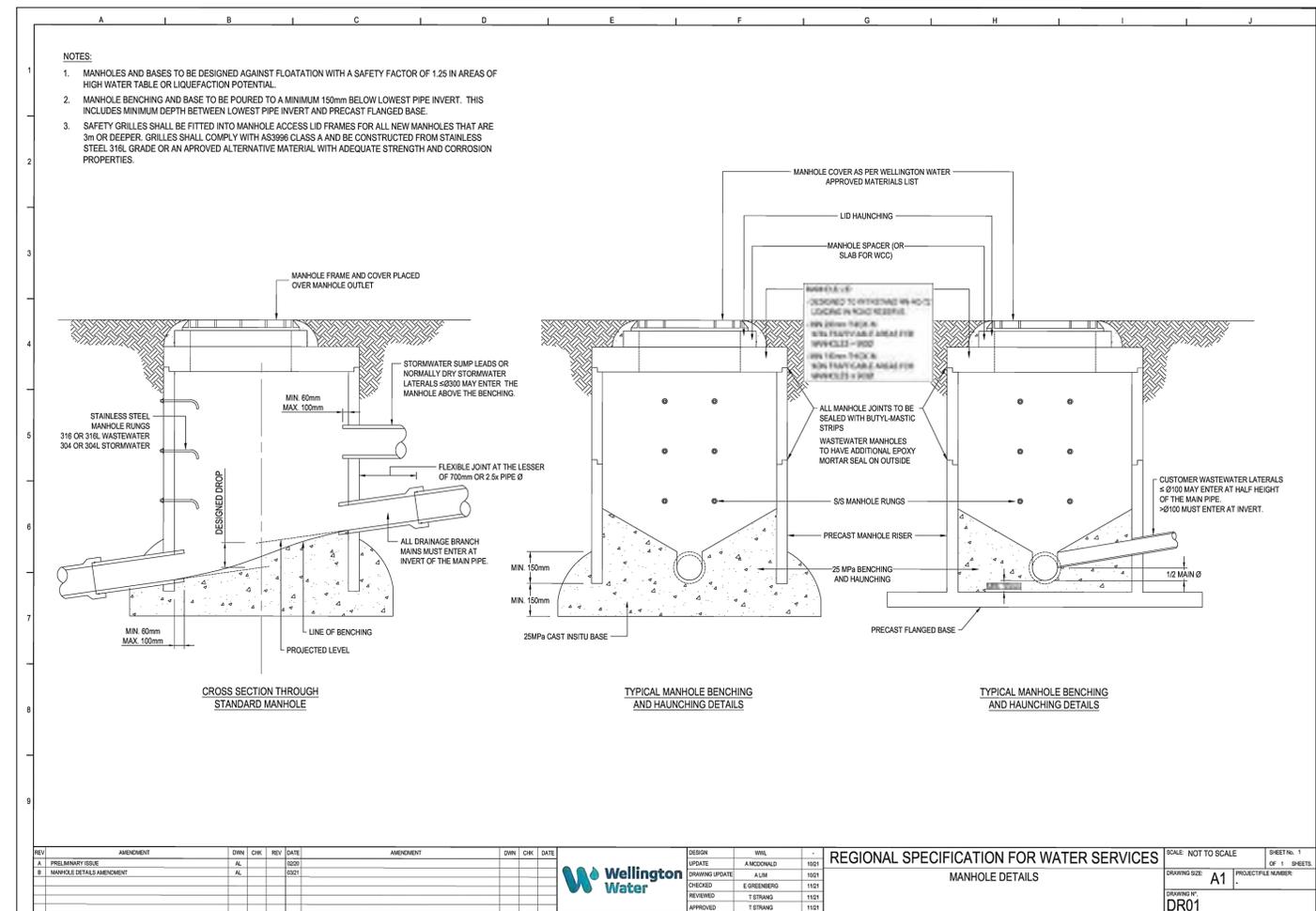
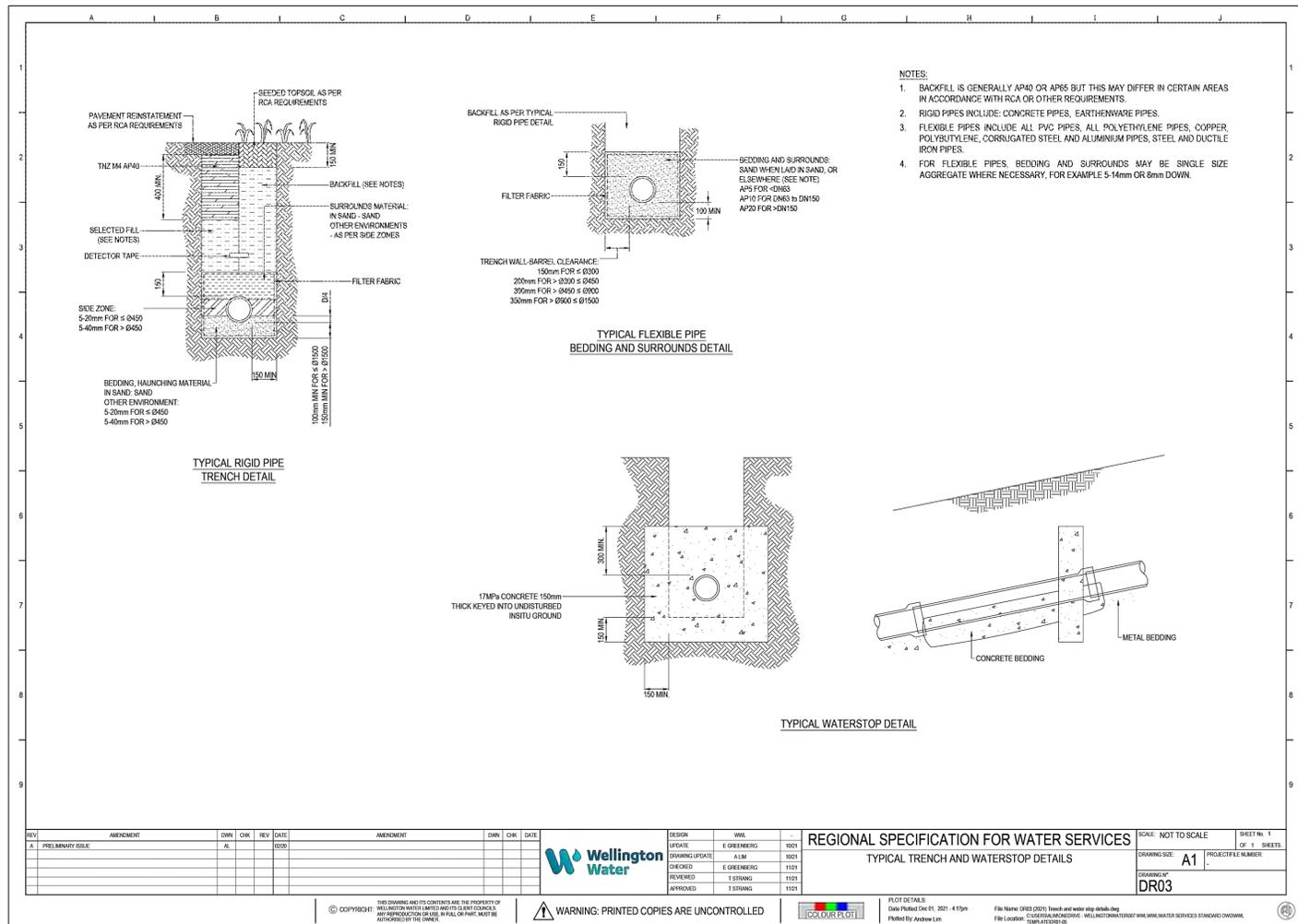
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details

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Drawn	DRL	Scale	as shown	(at A1)
Filename	147103.30 M-P-Details.dwg			
Job No	Sheet No	Rev		
147103.30	C90-03	A		

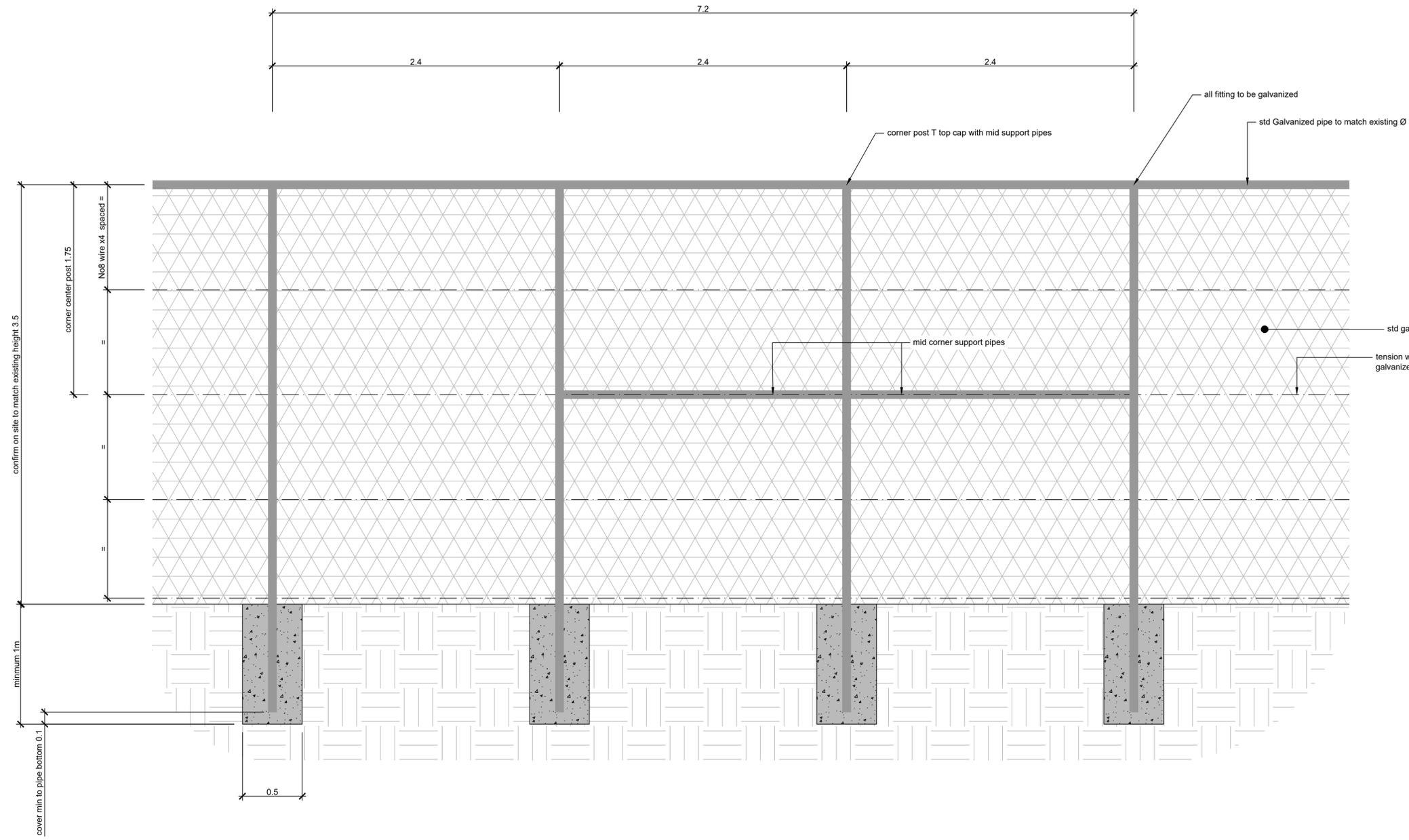


notes:

- Refer to drawing C00-01 for project notes.
- This drawing set contains colour. All reproduction to be in colour.

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Consultants				<p>Holmes NZ LP 469 Grey Street Hamilton 3216 New Zealand holmesanz.com T: +64 7 856 4849</p>	<p>WIAL-UNCOVERED CARPARK WELLINGTON</p>	Sheet Title		The copyright of this drawing remains with Holmes NZ LP		
						details		Drawn	DRL	Scale
						Filename		147103.30 M-P-Details.dwg		
						Job No		Sheet No		Rev
						147103.30 C90-04				A



existing section of fence photo



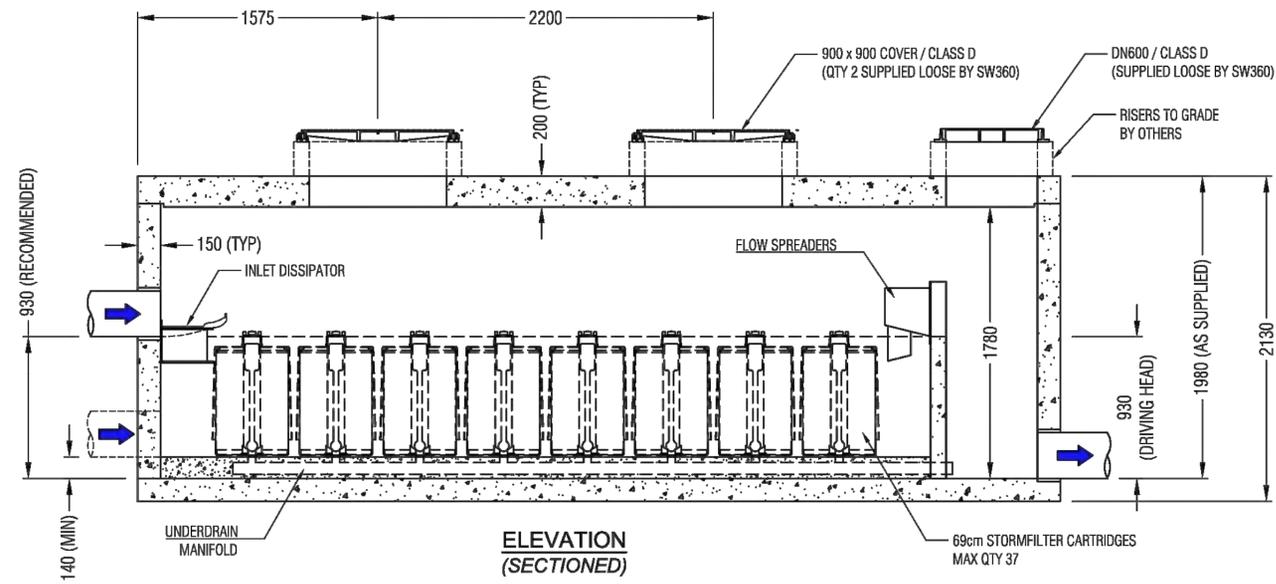
existing corner section of fence photo

notes:

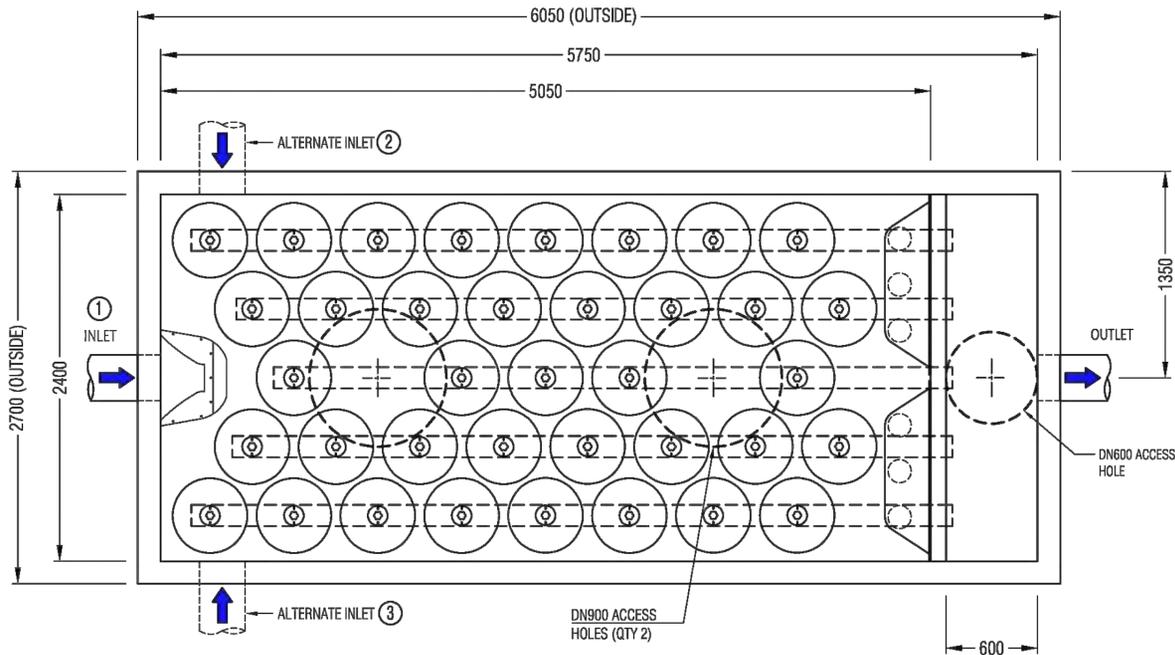
1. Refer to drawing C00-01 for project notes.
2.  This drawing set contains colour. All reproduction to be in colour.

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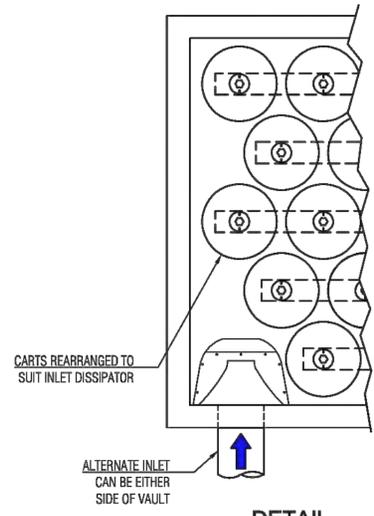
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Consultants							
A	22/03/2024	JA	Detail design				
Rev	Date	Appd	Reason				



ELEVATION
(SECTIONED)



PLAN VIEW
(LID OMITTED)



DETAIL
(ALTERNATE INLET)

TO BE COMPLETED BY CUSTOMER / CONTRACTOR

COMPANY :		P.O. NUMBER :	
SITE ADDRESS :			
SITE CONTACT & PHONE :			
PREFERRED DELIVERY DATE (TBC SW360) :			
STORMFILTER REFERENCE (IF APPLICABLE) :			
INLET PIPE Ø :	PIPE MATERIAL :	CORE DRILL Ø :	INLET (IL) :
OUTLET PIPE Ø :	PIPE MATERIAL :	CORE DRILL Ø :	OUTLET (IL) :
INLET ORIENTATION :	1 2 3	LID LEVEL (RL) :	DTI :
COMPLETED BY :	SIGNED :		DATE :

TO BE COMPLETED BY SW360

SW360 PRODUCT CODE :				
MEDIA TYPE (CIRCLE ONE) :	PERLITE	ZPG	OTHER :	
CARTRIDGE QTY (STATE) :				PRE-INSTALLATION (Y/N) :
SP FLOW RATE (CIRCLE ONE) :	FULL (Ø 27.6 ID) BLACK/MUSTARD	3 QTR (Ø 24.0 ID) WHITE/OPAL	HALF (Ø 19.7 ID) GREEN	OTHER :
ACCESS COVERS (CIRCLE ONE) :	AS DRAWN - YES or NO			OTHER :
COMPLETED BY :	SIGNED :		DATE :	

APPROX WEIGHTS

VAULT WEIGHT: **22600 Kg** (EMPTY)
 VAULT WEIGHT: **24450 Kg** (WITH 37 X ZPG CARTS FITTED)
 LID WEIGHT : **8000 Kg**

NOTES

- SW360 TO CONFIRM WEIGHTS AND LIFTING DETAILS PRIOR TO DELIVERY.
- UNIT SUPPLIED WITH INLET & OUTLET HOLES PRE-CORED.
- INLET AND OUTLET PIPES BY OTHERS.
- SEALING / GROUTING OF CONCRETE LID AND PIPES BY CONTRACTOR, ENSURING LOCAL CODES AND REGULATIONS ARE COMPLIED WITH.
- ANY RISERS REQUIRED TO INCREASE THE DEPTH TO INVERT (DTI) FROM THAT AS DRAWN TO BE SUPPLIED BY THE CONTRACTOR. CONTACT **0800STORMWATER** FOR DETAILS.
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION RELATED EROSION RUNOFF.
- BACKFILL, BEDDING AND BUOYANCY DESIGN BY ENGINEER OF RECORD
- QTY OF CARTRIDGES BY ENGINEER OF RECORD.
- CONCRETE VAULT AND LID DESIGNED AND MANUFACTURED TO HN-HO-72
- DESIGN CHECK REQUIRED WHEN COVER ABOVE LID EXCEEDS 1.0M.
- OTHER CONFIGURATIONS ARE POSSIBLE. FOR REQUIREMENTS OUTSIDE OF DRAWING SPECIFICATIONS PLEASE CONTACT **0800STORMWATER**.



0800 STORMWATER
 sales@stormwater360.co.nz
 www.stormwater360.co.nz

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STORMFILTER®
 CARTRIDGE FILTRATION SYSTEM
 37 x 69cm CARTRIDGE VAULT
 GENERAL ARRANGEMENT

SCALE : N.T.S. DRG No : SF-V-69-5824-20

JOB NO :		REV	REVISION DETAIL	DATE
PROJECT :		0	APPROVED	24/09/20
DRN :	G.S. 25/06/20			
CKD :	K.J. 08/09/20			

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Consultants				
Rev	Date	Appd	Reason	
A	22/03/2024	JA	Detail design	



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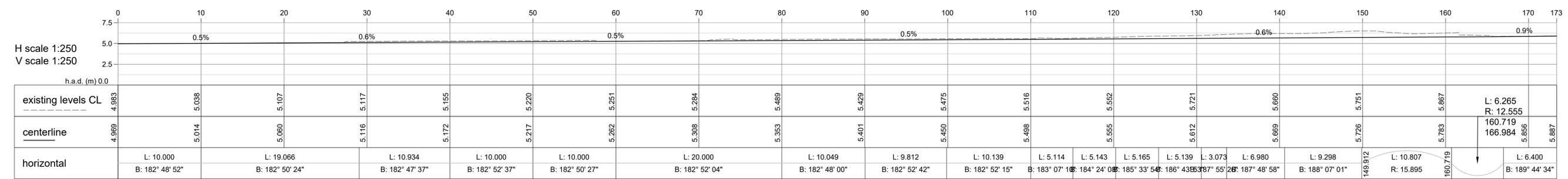
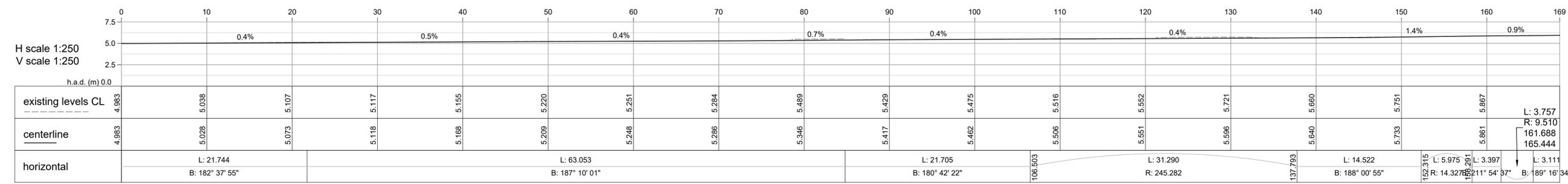
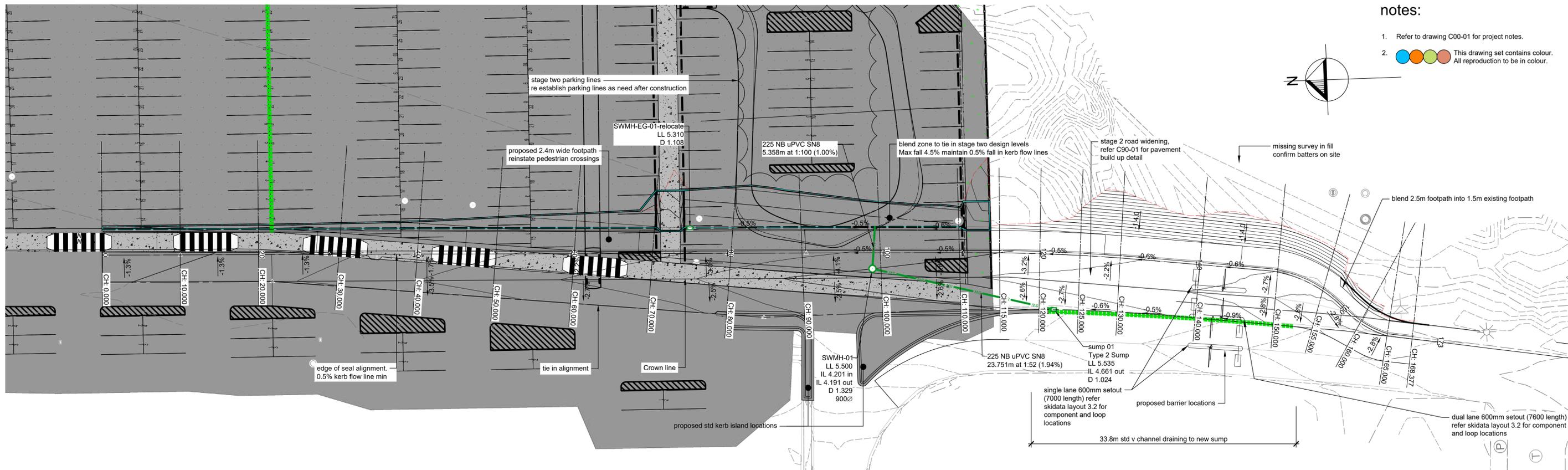
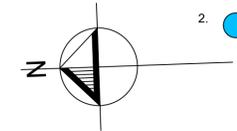
WIAL-UNCOVERED CARPARK
 WELLINGTON

Sheet Title
 details

Drawn	DRL	Scale	as shown	(at A1)
Filename	147103.30 M-P-Details.dwg			
Job No	Sheet No	Rev		
147103.30	C90-06	A		

notes:

- Refer to drawing C00-01 for project notes.
- This drawing set contains colour. All reproduction to be in colour.



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Consultants			
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A	22/03/2024	JA	Detail design



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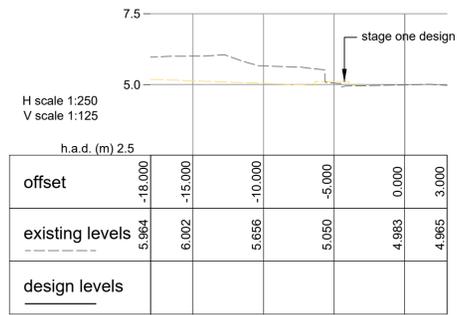
WIAL-UNCOVERED CARPARK
WELLINGTON

Sheet Title
stage two
road extension plan
and profiles

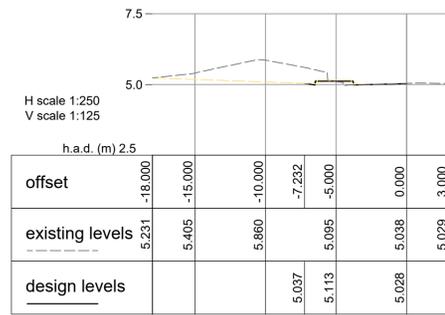
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Filename	147103.30 M-P-final levels road extension.dwg			
Job No	Sheet No		Rev	
147103.30	C102-01		A	

notes:

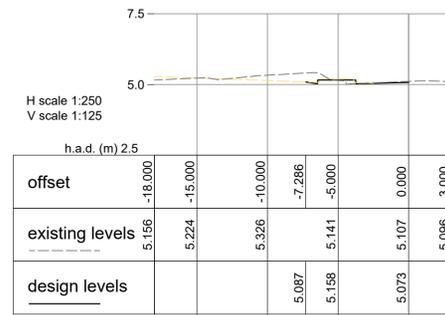
- Refer to drawing C00-01 for project notes.
-  This drawing set contains colour. All reproduction to be in colour.



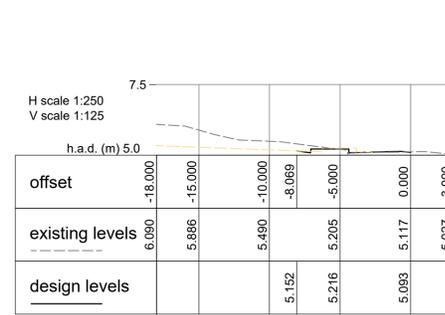
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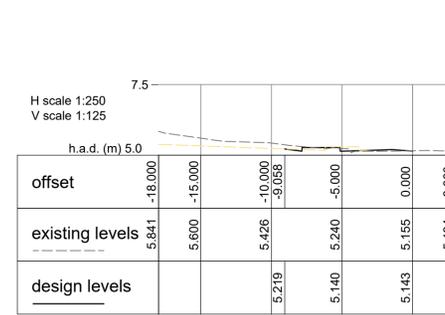
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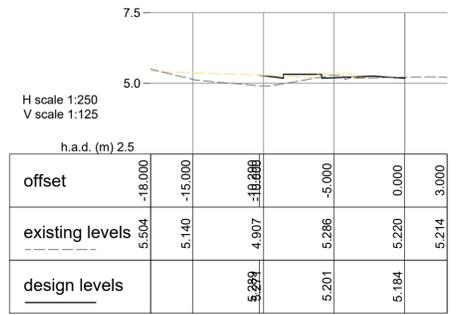
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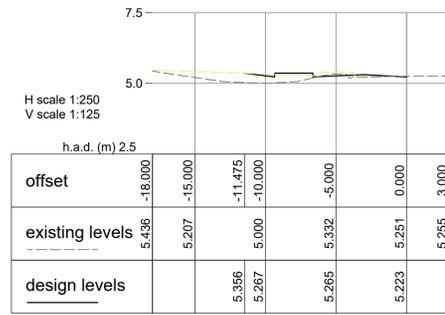
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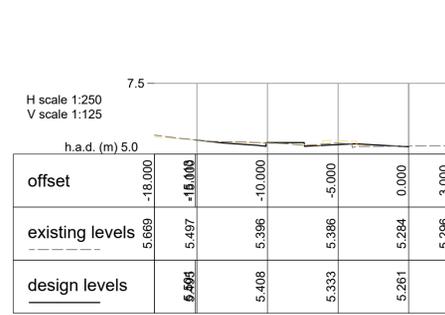
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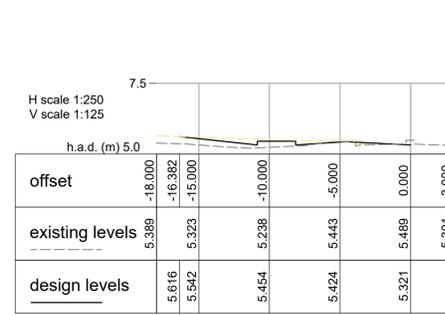
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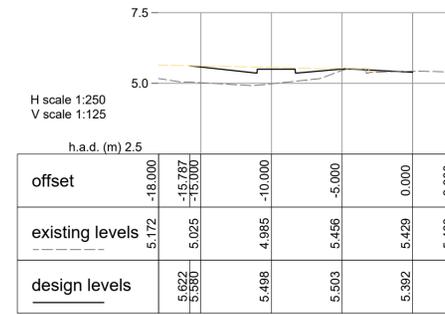
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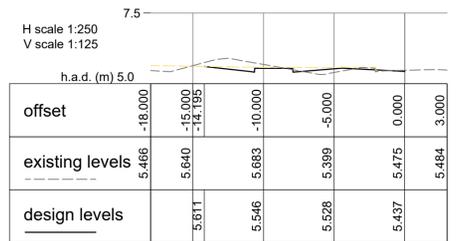
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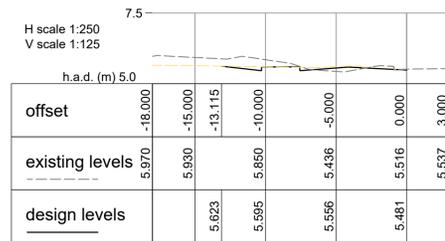
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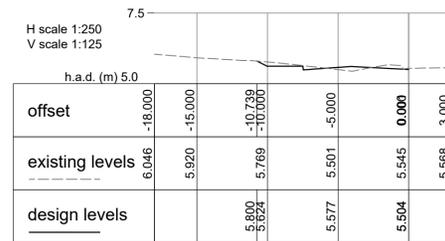
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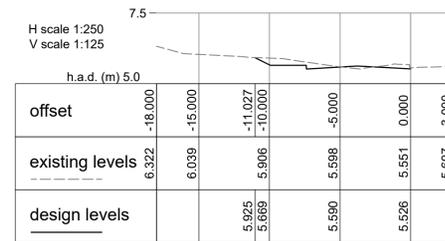
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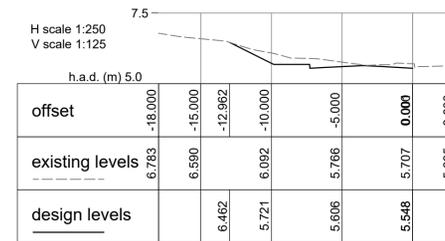
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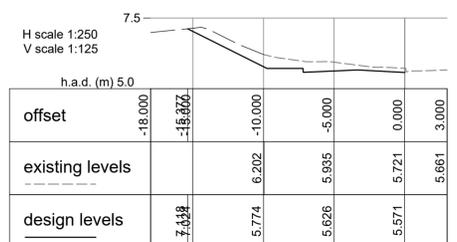
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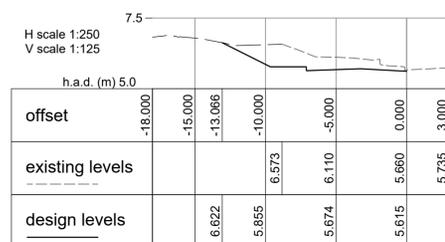
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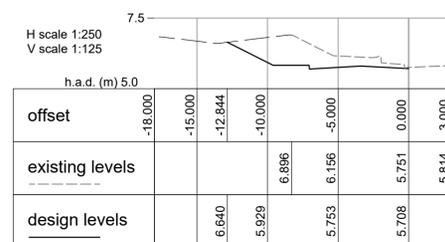
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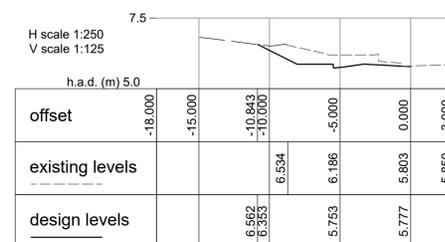
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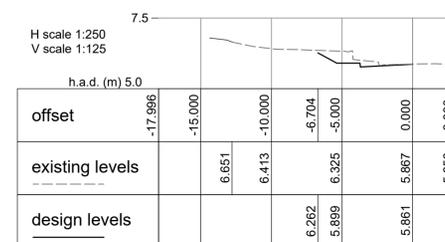
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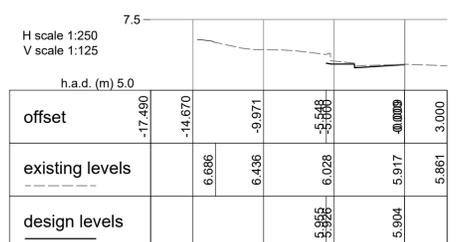
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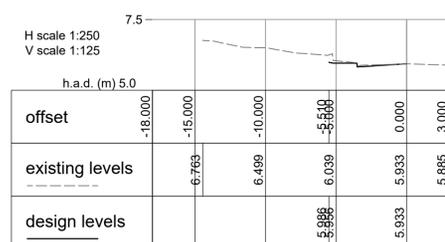
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Chainage 160.000



Chainage 165.000



Chainage 168.377

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Rev	Date	Appd	Reason

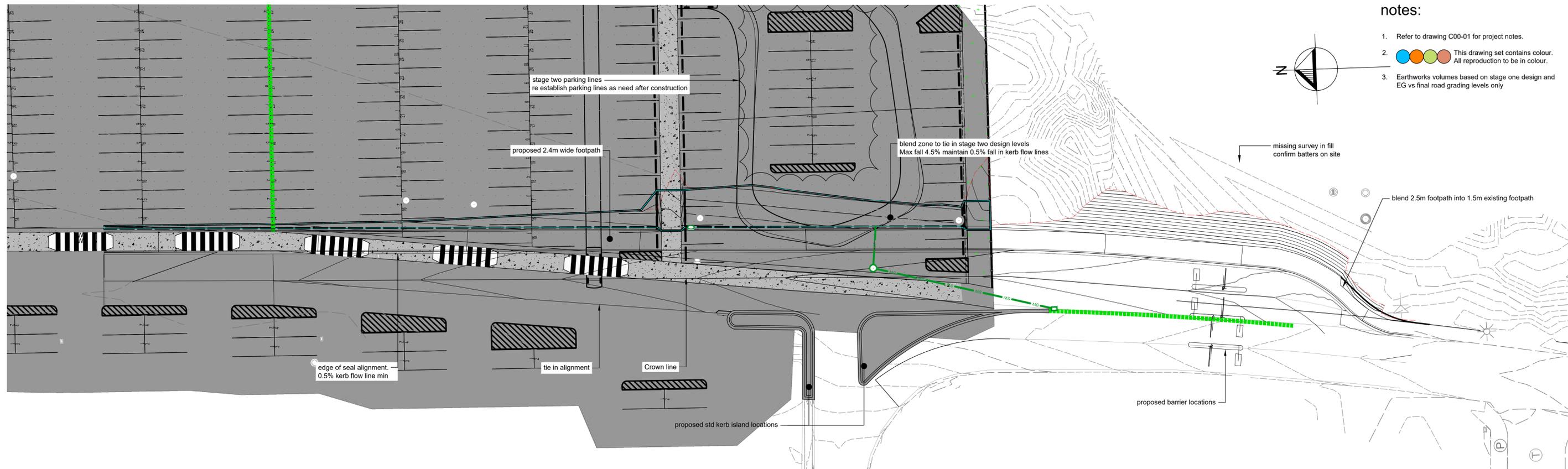


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WIAL-UNCOVERED CARPARK
WELLINGTON

Sheet Title
stage two
cross sections

Drawn	DRL	Scale	as shown	(at A1)
Filename	147103.30 M-P-final levels road extension.dwg			
Job No	Sheet No	Rev		
147103.30	C103-01	A		



- notes:
1. Refer to drawing C00-01 for project notes.
 2. This drawing set contains colour. All reproduction to be in colour.
 3. Earthworks volumes based on stage one design and EG vs final road grading levels only

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1	Red	-1.076	-0.600
2	Red	-0.600	-0.300
3	Red	-0.300	0.000
4	Green	0.000	0.100
5	Green	0.100	0.200

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
basic earthworks	1.000	1.000	1942.557sq.m	263.769 Cu. M.	16.189 Cu. M.	247.580 Cu. M.<Cut>
Totals			1942.557sq.m	263.769 Cu. M.	16.189 Cu. M.	247.580 Cu. M.<Cut>

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Consultants				 <p>Holmes NZ LP 469 Grey Street Hamilton 3216 New Zealand holmesanz.com T: +64 7 856 4849</p>	<p>WIAL-UNCOVERED CARPARK WELLINGTON</p>	Sheet Title		Drawn	DRL	Scale	1:250	(at A1)					
<table border="1"> <thead> <tr> <th>Rev</th> <th>Date</th> <th>Appd</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>22/03/2024</td> <td>JA</td> <td>Detail design</td> </tr> </tbody> </table>						Rev	Date	Appd	Reason	A	22/03/2024	JA	Detail design	stage two earthwork volumes plan			Filename
Rev	Date	Appd	Reason														
A	22/03/2024	JA	Detail design														
						Job No	147103.30 C105-01		Sheet No	A							

Appendix B

Laboratory certificates



Certificate of Analysis

GHD Ltd
Level 1, 215 Lambton Quay
Wellington

Attention: Adam Gray

Phone: [REDACTED]

Email: [REDACTED]

Lab Reference: 24-18438
Submitted by: Will Conibear/ Alex Lucas
Date Received: 10/06/2024
Testing Initiated: 10/06/2024
Date Completed: 20/06/2024
Order Number: WIAL
Reference: 12635303

Sampling Site: WIAL Carpark

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories (or at the subcontracted laboratories, when applicable). Samples were in acceptable condition unless otherwise noted on this report. Specific testing dates are available on request.

Anion/Cation Suite

Client Sample ID			P2.06106	P2.3105
Date Sampled			1/06/2024	31/05/2024
Analyte	Unit	Reporting Limit	24-18438-1	24-18438-2
pH	pH	1	6.9	6.7
Electrical Conductivity	µS/cm	0.2	370	354
Total Alkalinity (CaCO ₃)	g CaCO ₃ /m ³	1	86.2	83.5
Chloride	g/m ³	0.5	35.2	34.3
Sulfate	g/m ³	0.15	4.31	4.04
Nitrate-N	g/m ³	0.002	<0.02	<0.02
Dissolved Reactive Phosphorus (FIA)	g/m ³	0.002	0.197	0.135
Ammonia as N	g/m ³	0.005	<0.05	<0.05
Sodium	g/m ³	0.01	57.9	53.6
Potassium	g/m ³	0.05	10.9	6.81
Calcium	g/m ³	0.05	12.1	8.81
Magnesium	g/m ³	0.01	6.00	5.21
Iron	g/m ³	0.005	0.901	2.55
Zinc	g/m ³	0.001	0.025	0.024
Manganese	g/m ³	0.0005	0.208	0.0605
Sum of Anions*	meq/L	0.01	2.81	2.72
Sum of Cations*	meq/L	0.01	3.94	3.47
EC/10*	(mS/m)/10	0.002	3.70	3.54

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited.

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PFAS in Water (Ultra-Trace)

Client Sample ID			P2.06106	P2.3105
Date Sampled			1/06/2024	31/05/2024
Analyte	Unit	Reporting Limit	24-18438-1	24-18438-2
Perfluorinated Sulfonic Acids (PFSA)				
PFPrS (linear)	µg/L	0.00020	<0.00020	<0.00020
PFBS (linear)	µg/L	0.00020	0.0050	0.0044
PFPeS (linear)	µg/L	0.00020	0.0011	0.00083
PFHxS (linear)	µg/L	0.00010	0.0059	0.0070
PFHxS (mono-branched)	µg/L	0.00010	0.00094	0.00089
PFHxS (di-branched)	µg/L	0.00010	0.00014	<0.00010
PFHxS (Total)	µg/L	0.00010	0.0070	0.0079
PFHpS (linear)	µg/L	0.00020	0.00034	0.00037
PFOS (linear)	µg/L	0.00010	0.0037	0.0034
PFOS (mono-branched)	µg/L	0.00010	0.0041	0.0061
PFOS (di-branched)	µg/L	0.00010	<0.00010	0.00030
PFOS (Total)	µg/L	0.00010	0.0079	0.0098
PFNS (linear)	µg/L	0.0010	<0.0010	<0.0010
PFDS (linear)	µg/L	0.0010	<0.0010	<0.0010
Perfluoroalkyl carboxylic Acids				
PFBA	µg/L	0.0010	0.0086	0.012
PFPeA	µg/L	0.00050	<0.00050	0.0016
PFHxA	µg/L	0.00040	<0.00040	0.0010
PFHpA	µg/L	0.00030	<0.00030	<0.00030
PFOA	µg/L	0.00020	0.00047	0.00070
PFNA	µg/L	0.00020	<0.00020	<0.00020
PFDA	µg/L	0.00020	<0.00020	<0.00020
PFUnDA	µg/L	0.0010	<0.0010	<0.0010
PFDoDA	µg/L	0.0010	<0.0010	<0.0010
PFTrDA	µg/L	0.0010	<0.0010	<0.0010
PFTeDA	µg/L	0.0010	<0.0010	<0.0010
Perfluorinated Sulfonamides				
PFOSA	µg/L	0.00020	<0.00020	<0.00020
N-EtFOSA	µg/L	0.0010	<0.0010	<0.0010
N-MeFOSA	µg/L	0.0010	<0.0010	<0.0010
Perfluorinated sulfonamidoacetic acids				
N-EtFOSAA	µg/L	0.0010	<0.0010	<0.0010
N-MeFOSAA	µg/L	0.0010	<0.0010	<0.0010
Perfluoroalkyl sulfonamidoethanols				
N-EtFOSE	µg/L	0.0010	<0.0010	<0.0010
N-MeFOSE	µg/L	0.0010	<0.0010	<0.0010
Fluorotelomer Sulfonates				
4:2 FTS	µg/L	0.0010	<0.0010	<0.0010
6:2 FTS	µg/L	0.0050	<0.0050	<0.0050
8:2 FTS	µg/L	0.0010	<0.0010	<0.0010
Other				
HFPO-DA	µg/L	0.0010	<0.0010	<0.0010
PFAS Summations				
Sum (PFHxS (Total) + PFOS (Total))*	µg/L		0.015	0.018

PFAS in Water (Ultra-Trace)

Client Sample ID		P2.06106	P2.3105
Date Sampled		1/06/2024	31/05/2024
Sum (PFOS (Total) + PFOA (Total))*	µg/L	0.0083	0.010
Sum (PFHxS (Total) + PFOS (Total) + PFOA)*	µg/L	0.015	0.018
Sum of PFAS (n=10)*	µg/L	0.029	0.038
Sum of PFAS (n=30)*	µg/L	0.030	0.039
Internal Standards / Surrogates			
13C3-PFBS-Na	%	1	77
13C3-PFHxS-Na	%	1	85
13C8-PFOS-Na	%	1	73
13C4-PFBA	%	1	71
13C5-PFPeA	%	1	78
13C5-PFHxA	%	1	85
13C4-PFHpA	%	1	96
13C8-PFOA	%	1	96
13C9-PFNA	%	1	86
13C6-PFDA	%	1	80
13C7-PFUdA	%	1	81
13C2-PFDoDA	%	1	85
13C2-PFTeDA	%	1	58
13C8-FOSA	%	1	78
D5-N-EtFOSA-M	%	1	57
D3-N-MeFOSA-M	%	1	61
D5-N-EtFOSAA	%	1	68
D3-N-MeFOSAA	%	1	65
D9-N-EtFOSE-M	%	1	85
D7-N-MeFOSE-M	%	1	83
13C2-4:2 FTS-Na	%	1	70
13C2-6:2 FTS-Na	%	1	78
13C2-8:2 FTS-Na	%	1	69
13C3-HFPO-DA	%	1	84

Method Summary

pH	Samples measured as received using a conventional pH electrode. (APHA 4500 H ⁺ B. Online edition).
Electrical Conductivity	Samples analysed as received using a conventional conductivity electrode. (APHA 2510 B - Modified - Auto-titrator - Online edition).
Total Alkalinity (CaCO₃)	Samples analysed as received by potentiometric titration. (APHA 2320 B Online edition).
Chloride	Analysis by Ion exchange chromatography following sample filtration. (APHA 4110 B - Online edition).
Sulfate	Analysis by Ion exchange chromatography following sample filtration. (APHA 4110B - Online edition).
NO₃-N	Calculated from oxidised nitrogen and Nitrite-N, measured colourimetrically by flow injection analysis. (APHA NO ₃ - I. Online edition)
Dissolved Reactive Phosphorus	Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-P G - Modified - Online edition)
Ammonia-N	Samples filtered and measured colourimetrically by flow injection analysis. (APHA 4500-NH ₃ H - Modified - Online edition).

Method Summary

Soluble Trace Elements	Samples were analysed as received by the laboratory using ICP-MS following a 0.45µm membrane filtration (except when field filtered). In house procedure based on US EPA 200.8.
Sum of Anions	Sum of milliequivalents/Litre of measured Anions.
Sum of Cations	Sum of milliequivalents/Litre of measured Cations.
Poly- and Perfluorinated Alkyl Substances in Water	The whole PFAS container is extracted and the sample container rinsed with extraction solution. The sample is pre-concentrated by SPE using a mixed mode reversed phase/weak anion exchange phase. Heavily labelled internal standards are added at the start of the extraction and absolute recoveries reported. Final analysis of the extracts is performed by LCMSMS using an internal standardisation calibration protocol. In accordance with in-house procedure. A PFAS Summation result of N/A indicates that none of the individual analytes being summed were present at a level equal to or above the stated reporting limit.

PFAS Summation	Calculation
Sum of PFAS (N=10)	PFBA + PFPeA + PFHxA + PFHpA + PFOA + PFBS (linear) + PFHxS (total) + PFOS (total) + 6:2 FTS + 8:2 FTS
Sum of PFAS (N=30)	PFPrS (linear) + PFBS (linear) + PFPeS (linear) + PFHxS (total) + PFHpS (linear) + PFOS (total) + PFNS (linear) + PFDS (linear) + PFBA + PFPeA + PFHxA + PFHpA + PFOA + PFNA + PFDA + PFUnDA + PFDoDA + PFTrDA + PFTeDA + PFOSA + N-EtFOSA + N-MeFOSA + N-EtFOSAA + N-MeFOSAA + N-EtFOSE + N-MeFOSE + 4:2 FTS + 6:2 FTS + 8:2 FTS + HFPO-DA

Short-hand Name	Full name
PFPrS (linear)	Perfluoro-1-propanesulfonic acid
PFBS (linear)	Perfluoro-1-butanesulfonic acid
PFPeS (linear)	Perfluoro-1-pentanesulfonic acid
PFHxS (linear)	Perfluoro-1-hexanesulfonic acid
PFHxS (mono-branched)	Trifluoromethylperfluoropentanesulfonic acid
PFHxS (di-branched)	Di(trifluoromethyl)perfluorobutanesulfonic acid
PFHxS (total)	<i>Sum of linear, mono-branched and di-branched</i>
PFHpS (linear)	Perfluoro-1-heptanesulfonic acid
PFOS (linear)	Perfluoro-1-octanesulfonic acid
PFOS (mono-branched)	Trifluoromethylperfluoroheptanesulfonic acid
PFOS (di-branched)	Di(trifluoromethyl)perfluorohexanesulfonic acid
PFOS (total)	<i>Sum of linear, mono-branched and di-branched</i>
PFNS (linear)	Perfluoro-1-nonanesulfonic acid
PFDS (linear)	Perfluoro-1-decanesulfonic acid
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUdA	Perfluoro-n-undecanoic acid
PFDoA	Perfluoro-n-dodecanoic acid
PFTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
PFOSA	Perfluoro-1-octanesulfonamide
N-EtFOSA	N-ethylperfluoro-1-octanesulfonamide
N-MeFOSA	N-methylperfluoro-1-octanesulfonamide
N-EtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
N-MeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
N-EtFOSE	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
N-MeFOSE	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
HFPO-DA	Tetrafluoro-2-heptafluoropropoxy-propanoic acid

[Redacted]
Sample Manager, B3000
Technician

[Redacted]
Vani Lakshmi, Ph.D.
Senior Technologist

[Redacted]
Bhargavi, Ph.D.
Sample Reception Technician

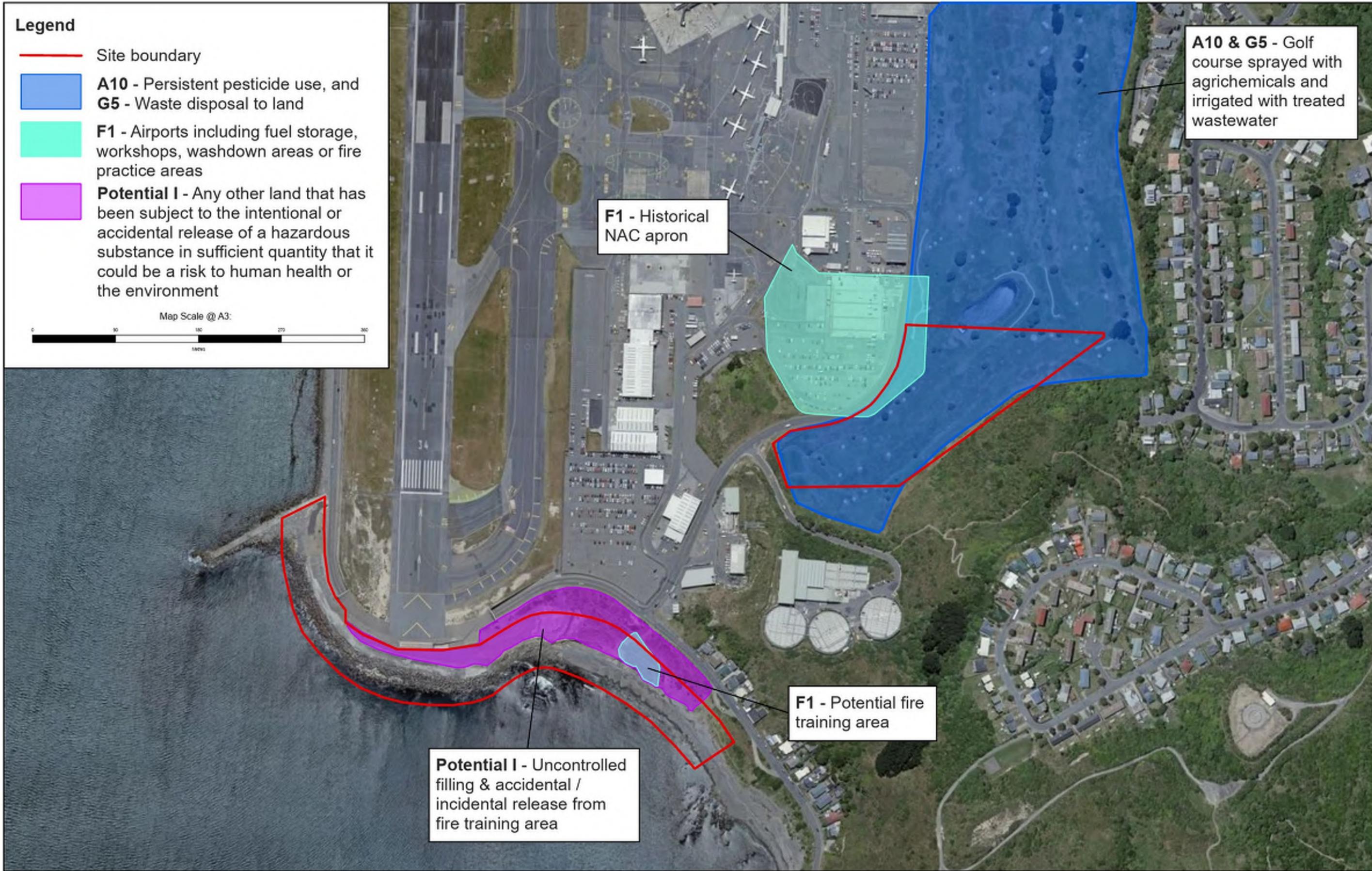
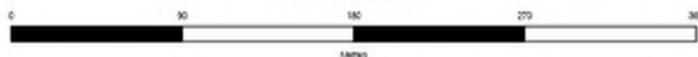
C

Appendix C – Preliminary HAIL Map

Legend

- Site boundary
- A10 - Persistent pesticide use, and G5 - Waste disposal to land**
- F1 - Airports including fuel storage, workshops, washdown areas or fire practice areas**
- Potential I - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment**

Map Scale @ A3:



Revision	Drawer	Verified	Approved	Date	Title:
1	GJS			01.10.24	PRELIMINARY SITE INVESTIGATION HAIL MAP
2	GJS			07.08.25	

PRELIMINARY SITE INVESTIGATION HAIL MAP

Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED
 Project: SEA DEFENCES STRUCTURES RENEWAL

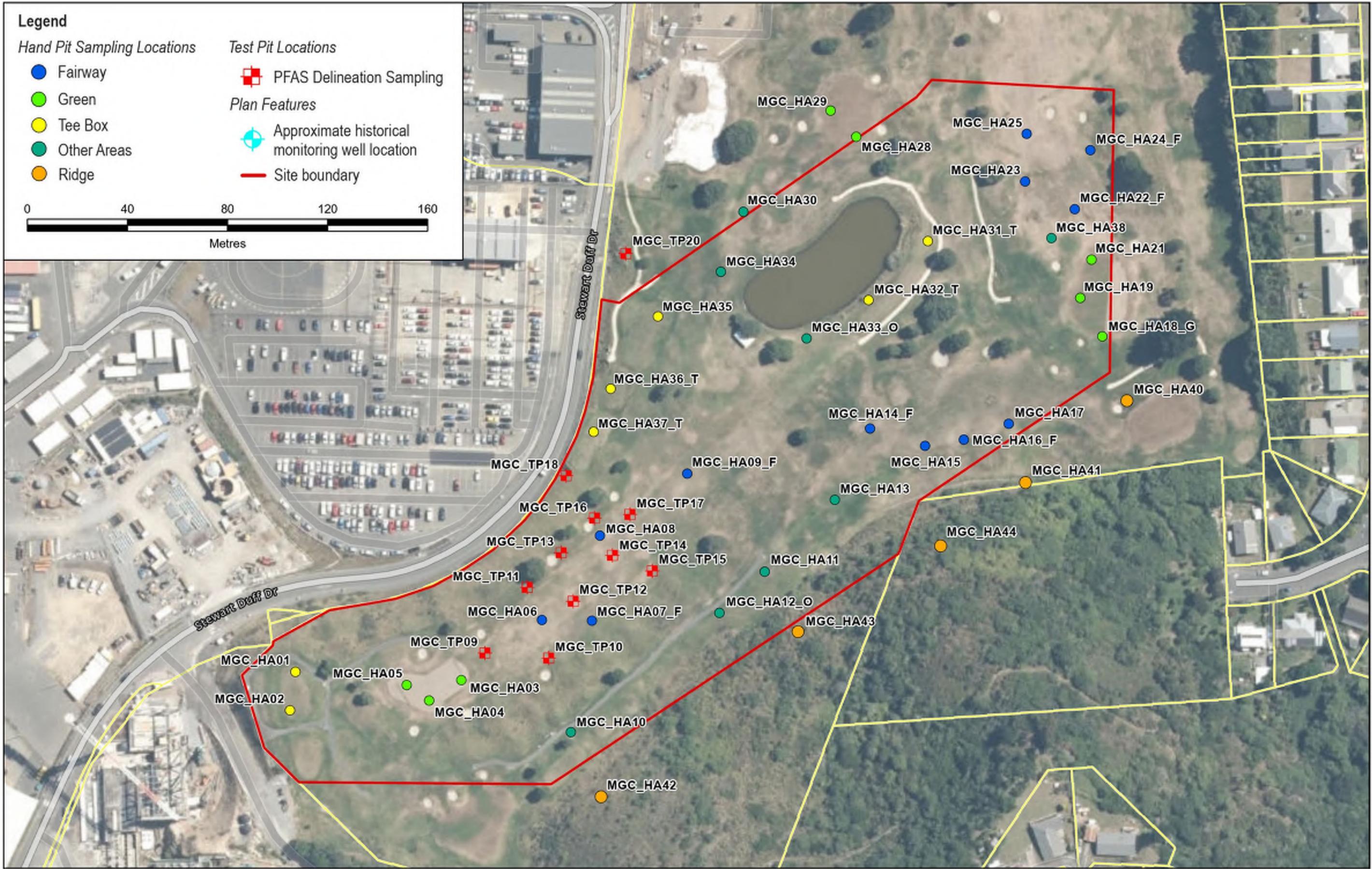


Discipline: ENVIRONMENTAL
 Drawing No.

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D

Appendix D – Sampling Location Plan



Revision	Drawer	Verified	Approved	Date	Title
1	GJS			28.08.25	MGC YARD SAMPLING LOCATION PLAN

MGC YARD SAMPLING LOCATION PLAN

Client: WELLINGTON INTERNATIONAL AIRPORT LIMITED 

Project: SEA DEFENCES STRUCTURES RENEWAL



Discipline: ENVIRONMENTAL

Drawing No. 3324338-3.1

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E

Appendix E – Chain of Custody

ANALYSIS REQUEST

Quote No

Primary Contact Tyler Never

Submitted By James McLennan

Client Name Beca Limited

Address 85 Molesworth Street, Thomdon, Wellington

Postcode 6011

Phone Mobile

Email

Charge To

Client Reference Miramar Golf Course

Additional Ref

(Consultant Project ID)

Order No

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

- Email Primary Contact
 Email Submitter
 Email Client
 Email Other
 Other

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

ADDITIONAL INFORMATION / KNOWN HAZARDS

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

Job No: Date Recv: 07-May-25 16:58

388 2108

Received by: Emma Morrison

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



CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 7/05

Name: Mia Ahijana

Tick if you require COC to be emailed back

Signature:

Received at Hill Laboratories
(Refer to Lab created Job No above)

Date & Time:

Name:

Signature:

Condition

- Room Temp
 Chilled
 Frozen

Temp: 17.6°C

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

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	MGC-HA01-0.0	7/5		Soil	hold cold
2	MGC-HA01-0.3				
3	MGC-HA02-0.1				
4	MGC-HA02-0.3				
5	MGC-HA03-0.1-G				
6	MGC-HA03-0.3-G				
7	MGC-HA04-0.1-G				
8	MGC-HA04-0.3-G				
9	MGC-HA05-0.1-G				
10	MGC-HA05-0.3-G				
11	MGC-HA06-0.1-F				
12	MGC-HA06-0.3-F				

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
13	M6C-HA07-0.1-F				
14	M6C-HA07-0.3-F				
15	M6C-HA08-0.1-F				
16	M6C-HA09-0.1-F				
17	M6C-HA09-0.3-F				
18	M6C-HA09-0.1-F				
19	M6C-HA10-0.1-0				
20	M6C-HA10-0.3-0				
21	M6C-HA11-0.1-0				
22	M6C-HA11-0.3-0				
23	M6C-HA12-0.1-0				
24	M6C-HA12-0.3-0				
25	M6C-HA13-0.1-0				
26	M6C-HA13-0.3-0				
27	M6C-HA14-0.1-0				
28	M6C-HA14-0.3-0				
29	M6C-HA15-0.1-F				
30	M6C-HA15-0.3-F				
31	M6C-HA16-0.1-F				
32	M6C-HA16-0.3-F				
33	M6C-HA16-0.1-F RAQC1				
34					
35					
36					
37					
38					
39					
40					



ANALYSIS REQUEST

Quote No

Primary Contact Tyler Never

Submitted By James McLennan

Client Name Beca Limited

Address 85 Molesworth Street, Thorndon, Wellington

Postcode 6011

Phone Mobile

Email

Charge To

Client Reference Miramar Golf Course

Additional Ref

(Consultant Project ID)

Order No

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

- Email Primary Contact
- Email Submitter
- Email Client
- Email Other
- Other

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

ADDITIONAL INFORMATION / KNOWN HAZARDS

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

Job No: Date Recv: 08-May-25 16:41

388 3331

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

Received by: Emma Morrison



CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 8/5 4:37

Name: Mi. Ahyema

Tick if you require COC to be emailed back

Signature:

Received at Hill Laboratories (Refer to Lab created Job No above)

Date & Time:

Name:

Signature:

Condition

- Room Temp
- Chilled
- Frozen

Temp:

19.9°C

Priority Low Normal High

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

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	MGC-HA16-0.1-F	8/5		soil	hold cold
2	MGC-HA16-0.3-F				
3	MGC-HA17-0.1-F				
4	MGC-HA17-0.3-F				
5	MGC-HA18-0.1-G				
6	MGC-HA18-0.3-G				
7	MGC-HA19-0.1-G				
8	MGC-HA19-0.3-G				
9	MGC-HA20-0.1-G				
10	MGC-HA20-0.3-G				
11	MGC-HA21-0.1-G				
12	MGC-HA21-0.3-G				

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
13	MGC-HA22-0.1-F				
14	MGC-HA22-0.3-F				
15	MGC-HA23-0.1-F				
16	MGC-HA23-0.3-F				
17	MGC-HA24-0.1-F				
18	MGC-HA24-0.3-F				
19	MGC-HA25-0.1-F				
20	MGC-HA25-0.3-F				
21	MGC-HA26-0.1-0				
22	MGC-HA26-0.3-0				
23	MGC-HA27-0.1-0				
24	MGC-HA27-0.3-0				
25	MGC-HA28-0.1-0				
26	MGC-HA28-0.3-0				
27	MGC-HA28-0.1-6				
28	MGC-HA28-0.3-6				
29	MGC-HA29-0.1-6				
30	MGC-HA30-0.1-0				
31	MGC-HA29-0.3-6				
32	MGC-HA30-0.3-0				
33	MGC-HA30-0.1-T				
34	MGC-HA31-0.3-T				
35	MGC-HA32-0.1-T				
36	MGC-HA32-0.3-T				
37	MGC-HA33-0.1-0				
38	MGC-HA33-0.3-0				
39	MGC-HA34-0.1-1				
40	MGC-HA34-0.3-1				

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
41	10 M6C-HA35-0.1	↓		↓	↓
42	11 M6C-HA35-0.3				
43	12 M6C-HA36-0.1-T				
44	13 M6C-HA36-0.3-T				
45	14 M6C-HA37-0.1-T				
46	15 M6C-HA37-0.3-T				
47	19 QAQC 2				
48	20 QAQC 3				
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					

ANALYSIS REQUEST

Quote No

Primary Contact Tyler Neve

Submitted By James McLennan

Client Name Beca Limited

Address 85 Molesworth St, Thorndon
Wellington Postcode 6011

Phone _____ Mobile _____

Email _____

Charge To _____

Client Reference Miramax Golf Course

Additional Ref _____ (Consultant Project ID)

Order No

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

- Email Primary Contact Email Submitter Email Client
 Email Other
 Other

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

ADDITIONAL INFORMATION / KNOWN HAZARDS

PFAS Sample

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

Job No: _____ Date Recv: 10-May-25 13:39

389 0688

Received by: Tyler Ritchie



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

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories	Date & Time: <u>16/05/25</u>
<input checked="" type="checkbox"/> Tick if you require COC to be emailed back	Name: <u>James McLennan</u>
	Signature: _____
Received at Hill Laboratories <i>(Refer to Lab created Job No above)</i>	Date & Time: _____
	Name: _____
	Signature: _____
Condition	Temp: <u>10.8°C</u>
<input type="checkbox"/> Room Temp <input type="checkbox"/> Chilled <input type="checkbox"/> Frozen	

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

Requested Reporting Date: _____

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	<u>Rinsate #1</u>	<u>07/05/25</u>		<u>Water</u>	<u>Hold Cold</u>
2	<u>Rinsate #2</u>	<u>07/05/25</u>		<u>Water</u>	<u>Hold Cold</u>
3	<u>Rinsate 3</u>	<u>07/05/25</u>		<u>Water</u>	<u>Hold Cold</u>
4					
5					
6					
7					
8					
9					
10					
11					
12					



Quote No

Primary Contact Tyler Neve

Submitted By Mio Akiyama

Client Name Beca Limited

Address 85 Molesworth Street, Thorndon, Wellington

Postcode 6011

Phone [Redacted] Mobile

Email [Redacted]

Charge To

Client Reference Miramar Golf Course

Order No [Redacted]

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

- Email Primary Contact Email Submitter Email Client
- Email Other [Redacted]
- Other

ANALYSIS REQUEST

R J Hill Laboratories Limited
221A Ellis Street, Hamilton 320
Private Bag 3205
Hamilton 3240, New Zealand

Job No: Date Recv: 15-Jul-25 17:03

393 9403

Received by: Emma Morrison

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



CHAIN OF CUSTODY RECORD

Sent to Hill Labs

Date & Time: 4:50 16/7

Name: Mio Akiyama

Tick if you require COC to be emailed back

Signature: [Redacted]

Received at Hill Labs

Date & Time:

(Refer to Lab created Job No above)

Name:

Signature:

Condition

Temp:

- Room Temp
- Chilled
- Frozen

11.2°C

ADDITIONAL INFORMATION / KNOWN HAZARDS

- Priority Low Normal High
 Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (If not as per Quote)
1	MUC - TP01 - 0.0	16/7		Soil	hold cold
2	MUC - TP010 - 0.3				
3	MUC - TP01 - 0.5				
4	MUC - TP010 - 1.0				
5	MUC - TP02 - 0.0				
6	MUC - TP02 - 0.3				
7	MUC - TP02 - 0.5				
8	MUC - TP02 - 1.0				
9	MUC - TP03 - 0.0				
10	MUC - TP03 - 0.3				
11	MUC - TP03 - 0.5				
12	MUC - TP03 - 1.0				

Continued on next page

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)				
13	MUL-TP04-0.0	16/7		Soil	hard cold				
14	MUL-TP04-0.3								
15	MUL-TP04-0.5								
16	MUL-TP04-1.0								
17	MUL-TP05-0.0								
18	MUL-TP05-0.3								
19	MUL-TP05-0.5								
20	MUL-TP05-1.0								
21	MUL-TP06-0.0								
22	MUL-TP06-0.3								
23	MUL-TP06-0.5								
24	MUL-TP06-1.0								
25	MUL-TP07-0.0								
26	MUL-TP07-0.3								
27	MUL-TP07-0.5								
28	MUL-TP07-1.0								
29	MUL-TP08-0.0								
30	MUL-TP08-0.3								
31	MUL-TP08-0.5								
32	MUL-TP08-1.0								
33	MUL-TP09-0.0								
34	MUL-TP09-0.3								
35	MUL-TP09-0.5								
36	MUL-TP09-1.0								
37	MUL-TP10-0.0								
38	MUL-TP10-0.3								
39	MUL-TP10-0.5								
40	MUL-TP10-1.0					✓			

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
13	MUC-TP11-0.0	16/7		Soil	bird w/d
14	MUC-TP11-0.5	↓		↓	↓
15	MUC-TP11-0.5				
16	MUC-TP11-1.0				
17	MUC-TP12-0.0				
18	MUC-TP12-0.5				
19	MUC-TP12-0.5				
20	MUC-TP12-1.0				
21	QAQC 1				
22	material				
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					



ANALYSIS REQUEST

Quote No _____
 Primary Contact Tyler Neve
 Submitted By Mio Akiyama
 Client Name Beca Limited
 Address 85 Molesworth Street, Thorndon, Wellington
 Postcode 6011

R J Hill Laboratories Limited
 221A Ellis Street, Hamilton 3204
 Private Bag 3205
 Hamilton 3240, New Zealand

Job No: _____ Date Recv: 17-Jul-25 15:17
394 0265

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

Received by: Kelsey Rohloff



CHAIN OF CUSTODY RECORD

Phone _____ Mobile _____
 Email _____

Charge To _____
 Client Reference Miramar Golf Course
 Order No _____

Results To *Reports will be emailed to Primary Contact by default. Additional Reports will be sent as specified below.*
 Email Primary Contact Email Submitter Email Client
 Email Other _____
 Other _____

Sent to Hill Labs Date & Time: 17/7 3:00pm
 Name: Mio Akiyama
 Tick if you require COC to be emailed back
 Signature: _____

Received at Hill Labs (Refer to Lab created Job No above)
 Date & Time: _____
 Name: _____
 Signature: _____

Condition Room Temp Chilled Frozen Temp: 14.5°C

ADDITIONAL INFORMATION / KNOWN HAZARDS

Priority Low Normal High
 Urgent (ASAP, extra charge applies, please contact lab first)
 Requested Reporting Date: _____

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	MGC-TP13-0.0	17/7		Soil	hold cold
2	MGC-TP13-0.3				
3	MGC-TP13-0.5				
4	MGC-TP13-1.0				
5	MGC-TP14-0.0				
6	MGC-TP14-0.3				
7	MGC-TP14-0.4				
8	MGC-TP14-0.6				
9	MGC-TP14-1.0				
10	MGC-TP15-0.0				
11	MGC-TP15-0.3				
12	MGC-TP15-0.5				

Continued on next page

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
13	MUC-TP15-1.0	12/7		Soil	hard cold
14	MUC-TP16-0.0				
15	MUC-TP16-0.3				
16	MUC-TP16-0.5				
17	MUC-TP16-1.0				
18	MUC-TP17-0.0				
19	MUC-TP17-0.3				
20	MUC-TP17-0.5				
21	MUC-TP17-1.0				
22	MUC-TP18-0.0				
23	MUC-TP18-0.3				
24	MUC-TP18-0.5				
25	MUC-TP18-1.0				
26	MUC-TP19-0.0				
27	MUC-TP19-0.3				
28	MUC-TP19-0.5				
29	MUC-TP19-1.0				
30	MUC-TP20-0.0				
31	MUC-TP20-0.3				
32	MUC-TP20-0.5				
33	MUC-TP20-1.0				
34	M. QARCC2				
35					
36					
37					
38					
39					
40					



ANALYSIS REQUEST

Quote No

Primary Contact And Tyler Neve

Submitted By Genevieve Jessica Smith

Client Name Beca Ltd

Address 85 Molesworth Street, WLG.

Postcode 6011

Phone [Redacted] Mobile [Redacted]

Email [Redacted]

Charge To

Client Reference MGC Ridge

Order No [Redacted]

Results To

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

- Email Primary Contact
- Email Submitter
- Email Client
- Email Other [Redacted]
- Other

R J Hill Laboratories Limited
221A Ellis Street, Hamilton 3204
Private Bag 3205
Hamilton 3240, New Zealand

Job No: Date Recv: 24-Jul-25 16:02

394 5293

Received by: Tyler Ritchie

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



CHAIN OF CUSTODY RECORD

Sent to Hill Labs

Date & Time: 24/7/25 @ 1530

Name: Genevieve J Smith

Tick if you require COC to be emailed back

Signature [Redacted]

Received at Hill Labs

Date & Time:

Name:

(Refer to Lab created Job No above)

Signature:

Condition

- Room Temp
- Chilled
- Frozen

Temp:

9.2

ADDITIONAL INFORMATION / KNOWN HAZARDS

All hold cold - SSI before discarding.

- Priority Low Normal High
 Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date: _____

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	MGC_HA40_0.0	24/7/25		ES	HOLD COLD
2	MGC_HA40_0.3	↓		↓	↓
3	MGC_HA41_0.0				
4	MGC_HA41_0.3				
5	MGC_HA42_0.0				
6	MGC_HA42_0.3				
7	MGC_HA43_0.0				
8	MGC_HA43_0.3				
9	MGC_HA44_0.0				
10	MGC_HA44_0.3				
11	MGC_QA1_240325				
12					

Continued on next page



ANALYSIS REQUEST

R J Hill Laboratories Limited
 221A Ellis Street, Hamilton 3204
 Private Bag 3205
 Hamilton 3240, New Zealand

Job No: Date Recv. 24-Jul-25 16:02

394 5294

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

Received by: Tyler Ritchie



Quote No

Primary Contact Tyler Neve

Submitted By Genevieve Jessica Smith

Client Name Beca Ltd

Address 85 Molesworth Street, WGA

Postcode 6011

Phone [REDACTED] Mobile [REDACTED]

Email [REDACTED]

Charge To

Client Reference MGC Ridge

Order No [REDACTED]

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

- Email Primary Contact Email Submitter Email Client
 Email Other [REDACTED]
 Other [REDACTED]

CHAIN OF CUSTODY RECORD

Sent to Hill Labs

Date & Time: 24/7/25 @ 1530

Name: Genevieve J Smith

Tick if you require COC to be emailed back

Signature: [REDACTED]

Received at Hill Labs
(Refer to Lab created Job No above)

Date & Time: [REDACTED]

Name:

Signature:

Condition

- Room Temp Chilled Frozen

Temp:

9.2

ADDITIONAL INFORMATION / KNOWN HAZARDS

All hold cold - SSI before discarding.

- Priority Low Normal High
 Urgent (ASAP, extra charge applies, please contact lab first)

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	MGC_HA40_0.0	24/7/25		ES	HOLD COLD
2	MGC_HA40_0.3	↓		↓	↓
3	MGC_HA41_0.0				
4	MGC_HA41_0.3				
5	MGC_HA42_0.0				
6	MGC_HA42_0.3				
7	MGC_HA43_0.0				
8	MGC_HA43_0.3				
9	MGC_HA44_0.0				
10	MGC_HA44_0.3				
11	MGC_QA1_240325				
12					

Continued on next page

F

Appendix F – Laboratory Analytical Reports

Certificate of Analysis

Page 1 of 15

Client:	Beca Limited	Lab No:	3883331	SPV3
Contact:	Tyler Neve	Date Received:	08-May-2025	
	C/- Beca Limited	Date Reported:	07-Oct-2025	(Amended)
	PO Box 3942	Quote No:	96766	
	Wellington 6140	Order No:	3324338/09	
		Client Reference:	Miramar Golf Course	
		Submitted By:	Mio Akiyama	

Sample Type: Soil						
Sample Name:	MGC_HA27_0.1_	MGC_HA27_0.3_	MGC_HA38_0.1_	MGC_HA38_0.3_	MGC_HA30_0.1_	
	O 08-May-2025	O 08-May-2025	O 08-May-2025	O 08-May-2025	O 08-May-2025	
Lab Number:	3883331.23	3883331.24	3883331.25	3883331.26	3883331.30	
Individual Tests						
Dry Matter	g/100g as rcvd	98	-	85	-	88
pH*	pH Units	5.9	6.1	5.6	5.7	6.3
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	5	4	5	6
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	9	8	8	9	10
Total Recoverable Copper	mg/kg dry wt	2	< 2	3	< 2	4
Total Recoverable Lead	mg/kg dry wt	6.3	3.9	6.6	4.0	8.7
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	6	6	6	7	7
Total Recoverable Zinc	mg/kg dry wt	26	24	30	25	35
Haloethers in SVOC Soil Samples by GC-MS						
Bis(2-chloroethoxy) methane	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Bis(2-chloroethyl)ether	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Bis(2-chloroisopropyl)ether	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4-Bromophenyl phenyl ether	mg/kg dry wt	< 0.3	-	< 0.4	-	< 0.4
4-Chlorophenyl phenyl ether	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Nitrogen containing compounds in SVOC Soil Samples by GC-MS						
2,4-Dinitrotoluene	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,6-Dinitrotoluene	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Nitrobenzene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
N-Nitrosodi-n-propylamine	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7
N-Nitrosodiphenylamine + Diphenylamine	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7
Organochlorine Pesticides in SVOC Soil Samples by GC-MS						
Aldrin	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
alpha-BHC	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
beta-BHC	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
delta-BHC	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
gamma-BHC (Lindane)	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4,4'-DDD	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4,4'-DDE	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4,4'-DDT	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Dieldrin	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Endosulfan I	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Endosulfan II	mg/kg dry wt	< 2	-	< 2	-	< 2
Endosulfan sulphate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Endrin	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7



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:	MGC_HA27_0.1_	MGC_HA27_0.3_	MGC_HA38_0.1_	MGC_HA38_0.3_	MGC_HA30_0.1_	
	O 08-May-2025					
Lab Number:	3883331.23	3883331.24	3883331.25	3883331.26	3883331.30	
Organochlorine Pesticides in SVOC Soil Samples by GC-MS						
Endrin ketone	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Heptachlor	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Heptachlor epoxide	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Hexachlorobenzene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*						
Acenaphthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Acenaphthylene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Anthracene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[a]anthracene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[k]fluoranthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
1&2-Chloronaphthalene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Chrysene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Fluoranthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Fluorene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
2-Methylnaphthalene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Naphthalene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Phenanthrene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Pyrene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 1.3	-	< 1.3	-	< 1.3
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 1.3	-	< 1.3	-	< 1.3
Phenols in SVOC Soil Samples by GC-MS						
4-Chloro-3-methylphenol	mg/kg dry wt	< 5	-	< 5	-	< 5
2-Chlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4-Dichlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4-Dimethylphenol	mg/kg dry wt	< 3	-	< 3	-	< 3
3 & 4-Methylphenol (m- + p-cresol)	mg/kg dry wt	< 3	-	< 3	-	< 3
2-Methylphenol (o-cresol)	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2-Nitrophenol	mg/kg dry wt	< 5	-	< 5	-	< 5
Pentachlorophenol (PCP)	mg/kg dry wt	< 30	-	< 30	-	< 30
Phenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4,5-Trichlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4,6-Trichlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Plasticisers in SVOC Soil Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	mg/kg dry wt	< 5	-	< 5	-	< 5
Butylbenzylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Di(2-ethylhexyl)adipate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Diethylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Dimethylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Di-n-butylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Di-n-octylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Other Halogenated compounds in SVOC Soil Samples by GC-MS						
1,2-Dichlorobenzene	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7
1,3-Dichlorobenzene	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7
1,4-Dichlorobenzene	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7
Hexachlorobutadiene	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7
Hexachloroethane	mg/kg dry wt	< 0.6	-	< 0.7	-	< 0.7
1,2,4-Trichlorobenzene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5

Sample Type: Soil						
Sample Name:	MGC_HA27_0.1_ O 08-May-2025	MGC_HA27_0.3_ O 08-May-2025	MGC_HA38_0.1_ O 08-May-2025	MGC_HA38_0.3_ O 08-May-2025	MGC_HA30_0.1_ O 08-May-2025	
Lab Number:	3883331.23	3883331.24	3883331.25	3883331.26	3883331.30	
Other compounds in SVOC Soil Samples by GC-MS						
Benzyl alcohol	mg/kg dry wt	< 10	-	< 10	-	< 10
Carbazole	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Dibenzofuran	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Isophorone	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Sample Name:	MGC_HA30_0.3_ O 08-May-2025	MGC_HA35_0.3_ O 08-May-2025	MGC_HA36_0.3_ T 08-May-2025	MGC_HA37_0.3_ T 08-May-2025	Composite of MGC_HA18_0.1_ G, MGC_HA19_0.1_ G, MGC_HA20_0.1_ G & MGC_HA21_0.1_ G	
Lab Number:	3883331.32	3883331.42	3883331.44	3883331.46	3883331.52	
Individual Tests						
Dry Matter	g/100g as rcvd	-	86	86	92	89
pH*	pH Units	6.7	-	-	-	5.9
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	6	-	-	-	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	-	-	-	< 0.10
Total Recoverable Chromium	mg/kg dry wt	9	-	-	-	7
Total Recoverable Copper	mg/kg dry wt	< 2	-	-	-	5
Total Recoverable Lead	mg/kg dry wt	3.8	-	-	-	4.1
Total Recoverable Mercury	mg/kg dry wt	< 0.10	-	-	-	< 0.10
Total Recoverable Nickel	mg/kg dry wt	6	-	-	-	6
Total Recoverable Zinc	mg/kg dry wt	24	-	-	-	26
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	-	< 0.012
alpha-BHC	mg/kg dry wt	-	-	-	-	< 0.012
beta-BHC	mg/kg dry wt	-	-	-	-	< 0.012
delta-BHC	mg/kg dry wt	-	-	-	-	< 0.012
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	-	< 0.012
cis-Chlordane	mg/kg dry wt	-	-	-	-	< 0.012
trans-Chlordane	mg/kg dry wt	-	-	-	-	< 0.012
2,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.012
4,4'-DDD	mg/kg dry wt	-	-	-	-	< 0.012
2,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.012
4,4'-DDE	mg/kg dry wt	-	-	-	-	< 0.012
2,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.012
4,4'-DDT	mg/kg dry wt	-	-	-	-	< 0.012
Total DDT Isomers	mg/kg dry wt	-	-	-	-	< 0.07
Dieldrin	mg/kg dry wt	-	-	-	-	< 0.012
Endosulfan I	mg/kg dry wt	-	-	-	-	< 0.012
Endosulfan II	mg/kg dry wt	-	-	-	-	< 0.012
Endosulfan sulphate	mg/kg dry wt	-	-	-	-	< 0.012
Endrin	mg/kg dry wt	-	-	-	-	< 0.012
Endrin aldehyde	mg/kg dry wt	-	-	-	-	< 0.012
Endrin ketone	mg/kg dry wt	-	-	-	-	< 0.012
Heptachlor	mg/kg dry wt	-	-	-	-	< 0.012
Heptachlor epoxide	mg/kg dry wt	-	-	-	-	< 0.012
Hexachlorobenzene	mg/kg dry wt	-	-	-	-	< 0.012
Methoxychlor	mg/kg dry wt	-	-	-	-	< 0.012

Sample Type: Soil

Sample Name:	Composite of MGC_HA18_0.3_ G, MGC_HA19_0.3_ G, MGC_HA20_0.3_ G & MGC_HA21_0.3_ G	Composite of MGC_HA22_0.1_ F, MGC_HA23_0.1_ F, MGC_HA24_0.1_ F & MGC_HA25_0.1_ F	Composite of MGC_HA22_0.3_ F, MGC_HA23_0.3_ F, MGC_HA24_0.3_ F & MGC_HA25_0.3_ F	Composite of MGC_HA31_0.1_ T & MGC_HA32_0.1_ T	Composite of MGC_HA31_0.3_ T & MGC_HA32_0.3_ T
Lab Number:	3883331.53	3883331.54	3883331.55	3883331.56	3883331.57

Individual Tests

Dry Matter	g/100g as rcvd	-	-	-	89	-
pH*	pH Units	6.2	6.1	6.3	7.2	7.2

Heavy Metals with Mercury, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	5	5	5	6	6
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	8	10	8	9	9
Total Recoverable Copper	mg/kg dry wt	2	4	3	3	3
Total Recoverable Lead	mg/kg dry wt	3.8	8.4	6.9	7.0	6.9
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	0.11
Total Recoverable Nickel	mg/kg dry wt	6	7	7	6	7
Total Recoverable Zinc	mg/kg dry wt	23	31	27	27	27

Organochlorine Pesticides Screening in Soil

Aldrin	mg/kg dry wt	-	-	-	< 0.011	-
alpha-BHC	mg/kg dry wt	-	-	-	< 0.011	-
beta-BHC	mg/kg dry wt	-	-	-	< 0.011	-
delta-BHC	mg/kg dry wt	-	-	-	< 0.011	-
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.011	-
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.011	-
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.011	-
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.011	-
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.011	-
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.011	-
4,4'-DDE	mg/kg dry wt	-	-	-	< 0.011	-
2,4'-DDT	mg/kg dry wt	-	-	-	< 0.011	-
4,4'-DDT	mg/kg dry wt	-	-	-	0.018	-
Total DDT Isomers	mg/kg dry wt	-	-	-	< 0.07	-
Dieldrin	mg/kg dry wt	-	-	-	< 0.011	-
Endosulfan I	mg/kg dry wt	-	-	-	< 0.011	-
Endosulfan II	mg/kg dry wt	-	-	-	< 0.011	-
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.011	-
Endrin	mg/kg dry wt	-	-	-	< 0.011	-
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.011	-
Endrin ketone	mg/kg dry wt	-	-	-	< 0.011	-
Heptachlor	mg/kg dry wt	-	-	-	< 0.011	-
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.011	-
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.011	-
Methoxychlor	mg/kg dry wt	-	-	-	< 0.011	-

Sample Name:	Composite of MGC_HA36_0.1_ T & MGC_HA37_0.1_ T	Composite of MGC_HA36_0.3_ T & MGC_HA37_0.3_ T	Composite of MGC_HA18_0.1_ G, MGC_HA19_0.1_ G, MGC_HA20_0.1_ G & MGC_HA21_0.1_ G	Composite of MGC_HA22_0.1_ F, MGC_HA23_0.1_ F, MGC_HA24_0.1_ F & MGC_HA25_0.1_ F	Composite of MGC_HA31_0.1_ T & MGC_HA32_0.1_ T
Lab Number:	3883331.58	3883331.59	3883331.60	3883331.61	3883331.62

Individual Tests

Dry Matter	g/100g as rcvd	88	-	-	-	-
pH*	pH Units	7.3	7.2	-	-	-

Sample Type: Soil

Sample Name:	Composite of MGC_HA36_0.1_T & MGC_HA37_0.1_T	Composite of MGC_HA36_0.3_T & MGC_HA37_0.3_T	Composite of MGC_HA18_0.1_G, MGC_HA19_0.1_G, MGC_HA20_0.1_G & MGC_HA21_0.1_G	Composite of MGC_HA22_0.1_F, MGC_HA23_0.1_F, MGC_HA24_0.1_F & MGC_HA25_0.1_F	Composite of MGC_HA31_0.1_T & MGC_HA32_0.1_T
Lab Number:	3883331.58	3883331.59	3883331.60	3883331.61	3883331.62

Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	4	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	-	-	-
Total Recoverable Chromium	mg/kg dry wt	8	8	-	-	-
Total Recoverable Copper	mg/kg dry wt	5	4	-	-	-
Total Recoverable Lead	mg/kg dry wt	4.7	4.6	-	-	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	-	-	-
Total Recoverable Nickel	mg/kg dry wt	6	6	-	-	-
Total Recoverable Zinc	mg/kg dry wt	28	26	-	-	-

Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	< 0.012	-	-	-	-
alpha-BHC	mg/kg dry wt	< 0.012	-	-	-	-
beta-BHC	mg/kg dry wt	< 0.012	-	-	-	-
delta-BHC	mg/kg dry wt	< 0.012	-	-	-	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.012	-	-	-	-
cis-Chlordane	mg/kg dry wt	< 0.012	-	-	-	-
trans-Chlordane	mg/kg dry wt	< 0.012	-	-	-	-
2,4'-DDD	mg/kg dry wt	< 0.012	-	-	-	-
4,4'-DDD	mg/kg dry wt	< 0.012	-	-	-	-
2,4'-DDE	mg/kg dry wt	< 0.012	-	-	-	-
4,4'-DDE	mg/kg dry wt	0.044	-	-	-	-
2,4'-DDT	mg/kg dry wt	< 0.012	-	-	-	-
4,4'-DDT	mg/kg dry wt	0.015	-	-	-	-
Total DDT Isomers	mg/kg dry wt	< 0.07	-	-	-	-
Dieldrin	mg/kg dry wt	< 0.012	-	-	-	-
Endosulfan I	mg/kg dry wt	< 0.012	-	-	-	-
Endosulfan II	mg/kg dry wt	< 0.012	-	-	-	-
Endosulfan sulphate	mg/kg dry wt	< 0.012	-	-	-	-
Endrin	mg/kg dry wt	< 0.012	-	-	-	-
Endrin aldehyde	mg/kg dry wt	< 0.012	-	-	-	-
Endrin ketone	mg/kg dry wt	< 0.012	-	-	-	-
Heptachlor	mg/kg dry wt	< 0.012	-	-	-	-
Heptachlor epoxide	mg/kg dry wt	< 0.012	-	-	-	-
Hexachlorobenzene	mg/kg dry wt	< 0.012	-	-	-	-
Methoxychlor	mg/kg dry wt	< 0.012	-	-	-	-

Sample Type: Soil

Sample Name:	MGC_HA27_0.1_O 08-May-2025	MGC_HA27_0.3_O 08-May-2025
Lab Number:	3883331.23	3883331.24

PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	-
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-

PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-

Sample Type: Soil					
			Sample Name:	MGC_HA27_0.1_O 08-May-2025	MGC_HA27_0.3_O 08-May-2025
			Lab Number:	3883331.23	3883331.24
PFAS in Soil - Perfluorocarboxylic Acids					
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-	
			Sample Name:	MGC_HA38_0.1_O 08-May-2025	MGC_HA38_0.3_O 08-May-2025
			Lab Number:	3883331.25	3883331.26
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	-	

Sample Type: Soil					
			Sample Name:	MGC_HA38_0.1_O 08-May-2025	MGC_HA38_0.3_O 08-May-2025
			Lab Number:	3883331.25	3883331.26
PFAS in Soil - Summary					
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPpS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-	
NFDHA	Nonafuoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-	

Sample Type: Soil					
			Sample Name:	MGC_HA30_0.1_O 08-May-2025	MGC_HA30_0.3_O 08-May-2025
			Lab Number:	3883331.30	3883331.32
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	-	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	

Sample Type: Soil					
			Sample Name:	MGC_HA30_0.1_O 08-May-2025	MGC_HA30_0.3_O 08-May-2025
			Lab Number:	3883331.30	3883331.32
PFAS in Soil - Miscellaneous					
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-	
			Sample Name:	MGC_HA35_0.3 08-May-2025	MGC_HA36_0.3_T 08-May-2025
			Lab Number:	3883331.42	3883331.44
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0019	0.0014	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0019	0.0015	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0017	0.0012	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0019	0.0014	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_HA35_0.3 08-May-2025	MGC_HA36_0.3_T 08-May-2025
			Lab Number:	3883331.42	3883331.44
PFAS in Soil - Miscellaneous					
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_HA37_0.3_T 08-May-2025	Composite of MGC_HA18_0.1_G, MGC_HA19_0.1_G, MGC_HA20_0.1_G & MGC_HA21_0.1_G
			Lab Number:	3883331.46	3883331.52
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	-	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomer carboxylic acid	mg/kg dry wt	< 0.0010	-	
5:3 FTCA	5:3 Fluorotelomer carboxylic acid	mg/kg dry wt	< 0.0010	-	

Sample Type: Soil					
			Sample Name:	MGC_HA37_0.3_T 08-May-2025	Composite of MGC_HA18_0.1_G, MGC_HA19_0.1_G, MGC_HA20_0.1_G & MGC_HA21_0.1_G
			Lab Number:	3883331.46	3883331.52
PFAS in Soil - Fluorotelomer Carboxylic Acid					
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-	
			Sample Name:	Composite of MGC_HA36_0.3_T & MGC_HA37_0.3_T	Composite of MGC_HA18_0.1_G, MGC_HA19_0.1_G, MGC_HA20_0.1_G & MGC_HA21_0.1_G
			Lab Number:	3883331.59	3883331.60
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	-	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	-	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	-	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	-	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	-	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	-	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	-	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	-	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	-	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	-	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	-	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	-	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	-	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	

Sample Type: Soil					
			Sample Name:	Composite of MGC_HA36_0.3_T & MGC_HA37_0.3_T	Composite of MGC_HA18_0.1_G, MGC_HA19_0.1_G, MGC_HA20_0.1_G & MGC_HA21_0.1_G
			Lab Number:	3883331.59	3883331.60
PFAS in Soil - Perfluorosulfonic Acids					
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	-	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	-	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	-	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	-	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	-	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	-	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	-	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	-	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	-	< 0.0010	
			Sample Name:	Composite of MGC_HA22_0.1_F, MGC_HA23_0.1_F, MGC_HA24_0.1_F & MGC_HA25_0.1_F	Composite of MGC_HA31_0.1_T & MGC_HA32_0.1_T
			Lab Number:	3883331.61	3883331.62
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil

Sample Name:	Composite of MGC_HA22_0.1_F, MGC_HA23_0.1_F, MGC_HA24_0.1_F & MGC_HA25_0.1_F	Composite of MGC_HA31_0.1_T & MGC_HA32_0.1_T
Lab Number:	3883331.61	3883331.62

PFAS in Soil - Perfluorosulfonic Acids

L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010

PFAS in Soil - Fluorotelomer Sulfonic Acids

4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010

PFAS in Soil - Fluorotelomer Carboxylic Acid

3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010

PFAS in Soil - Miscellaneous

11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Name:	Composite of MGC_HA36_0.1_T & MGC_HA37_0.1_T
Lab Number:	3883331.63

PFAS in Soil - Summary

PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046

PFAS in Soil - Perfluorocarboxylic Acids

PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010

Sample Type: Soil

Sample Name:	Composite of MGC_HA36_0.1_T & MGC_HA37_0.1_T
Lab Number:	3883331.63

PFAS in Soil - Perfluorocarboxylic Acids			
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010

PFAS in Soil - Perfluorosulfonic Acids			
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010
L-PFNS	Perfluoronanesulfonic acid	mg/kg dry wt	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010

PFAS in Soil - Fluorotelomer Sulfonic Acids			
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010

PFAS in Soil - Fluorotelomer Carboxylic Acid			
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010

PFAS in Soil - Miscellaneous			
11Cl-PF3OUdS	11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3883331-SPv2' issued on 03-Oct-2025 at 5:06 pm. Reason for amendment: Amended sample Id as per clients request.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	23-26, 30, 32, 52-59
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	23-26, 30, 32, 52-59
Soil Prep Dry & Sieve for Agriculture	Air dried at 35°C and sieved, <2mm fraction.	-	23-26, 30, 32, 52-59
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).	0.10 g/100g as rcvd	23, 25, 30, 60-63
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	23, 25, 30, 42, 44, 46, 52, 56, 58
Composite PFAS Sample*	Individual sample fractions mixed together to form a composite fraction.	-	5, 7, 9, 11, 13, 15, 17, 19, 33, 35, 43, 45
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	5-20, 33-36, 43-46
pH*	1:2 (v/v) soil : water slurry followed by potentiometric determination of pH. In-house.	0.1 pH Units	23-26, 30, 32, 52-59
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. US EPA 200.2 (modified), APHA 3125 B: Online Edition.	0.10 - 4 mg/kg dry wt	23-26, 30, 32, 52-59
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	52, 56, 58
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	23, 25, 30
PFAS in Soil	Solvent extraction. LC-MS/MS analysis. Tested on as received sample. In-house based on ASTM D7968.	0.0010 - 0.046 mg/kg dry wt	23, 25, 30, 42, 44, 46, 60-63

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

Testing was completed between 19-May-2025 and 03-Oct-2025. For completion dates of individual analyses please contact the laboratory.

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

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


Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 16

Client:	Beca Limited	Lab No:	3882108	SPv4
Contact:	Tyler Neve	Date Received:	07-May-2025	
	C/- Beca Limited	Date Reported:	21-Jul-2025	(Amended)
	PO Box 3942	Quote No:	96766	
	Wellington 6140	Order No:	3324338/09	
		Client Reference:	Miramar Golf Course	
		Submitted By:	James McLennan	

Sample Type: Soil						
Sample Name:	MGC_HA10_0.1_	MGC_HA10_0.3_	MGC_HA13_0.1_	MGC_HA13_0.3_	QAQC1	
	O 07-May-2025	O 07-May-2025	O 07-May-2025	O 07-May-2025	07-May-2025	
Lab Number:	3882108.18	3882108.19	3882108.24	3882108.25	3882108.30	
Individual Tests						
Dry Matter	g/100g as rcvd	91	-	82	-	92
pH*	pH Units	5.9	6.3	7.7	8.3	6.0
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	5	5	5	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	9	8	8	8	9
Total Recoverable Copper	mg/kg dry wt	4	2	3	3	4
Total Recoverable Lead	mg/kg dry wt	5.7	4.3	6.5	6.1	5.7
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	7	6	7	7	7
Total Recoverable Zinc	mg/kg dry wt	31	24	28	28	31
Haloethers in SVOC Soil Samples by GC-MS						
Bis(2-chloroethoxy) methane	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Bis(2-chloroethyl)ether	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Bis(2-chloroisopropyl)ether	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4-Bromophenyl phenyl ether	mg/kg dry wt	< 0.4	-	< 0.4	-	< 0.4
4-Chlorophenyl phenyl ether	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Nitrogen containing compounds in SVOC Soil Samples by GC-MS						
2,4-Dinitrotoluene	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,6-Dinitrotoluene	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Nitrobenzene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
N-Nitrosodi-n-propylamine	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7
N-Nitrosodiphenylamine + Diphenylamine	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7
Organochlorine Pesticides in SVOC Soil Samples by GC-MS						
Aldrin	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
alpha-BHC	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
beta-BHC	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
delta-BHC	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
gamma-BHC (Lindane)	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4,4'-DDD	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4,4'-DDE	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
4,4'-DDT	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Dieldrin	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Endosulfan I	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Endosulfan II	mg/kg dry wt	< 2	-	< 2	-	< 2
Endosulfan sulphate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Endrin	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7

Sample Type: Soil						
Sample Name:	MGC_HA10_0.1_	MGC_HA10_0.3_	MGC_HA13_0.1_	MGC_HA13_0.3_	QAQC1	
	O 07-May-2025	O 07-May-2025	O 07-May-2025	O 07-May-2025	07-May-2025	
Lab Number:	3882108.18	3882108.19	3882108.24	3882108.25	3882108.30	
Organochlorine Pesticides in SVOC Soil Samples by GC-MS						
Endrin ketone	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Heptachlor	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Heptachlor epoxide	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Hexachlorobenzene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*						
Acenaphthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Acenaphthylene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Anthracene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[a]anthracene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[k]fluoranthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
1&2-Chloronaphthalene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Chrysene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Fluoranthene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Fluorene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
2-Methylnaphthalene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Naphthalene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Phenanthrene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Pyrene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 1.3	-	< 1.3	-	< 1.3
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 1.3	-	< 1.3	-	< 1.3
Phenols in SVOC Soil Samples by GC-MS						
4-Chloro-3-methylphenol	mg/kg dry wt	< 5	-	< 5	-	< 5
2-Chlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4-Dichlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4-Dimethylphenol	mg/kg dry wt	< 3	-	< 3	-	< 3
3 & 4-Methylphenol (m- + p-cresol)	mg/kg dry wt	< 3	-	< 3	-	< 3
2-Methylphenol (o-cresol)	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2-Nitrophenol	mg/kg dry wt	< 5	-	< 5	-	< 5
Pentachlorophenol (PCP)	mg/kg dry wt	< 30	-	< 30	-	< 30
Phenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4,5-Trichlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
2,4,6-Trichlorophenol	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Plasticisers in SVOC Soil Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	mg/kg dry wt	< 5	-	< 5	-	< 5
Butylbenzylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Di(2-ethylhexyl)adipate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Diethylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Dimethylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Di-n-butylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Di-n-octylphthalate	mg/kg dry wt	< 1.0	-	< 1.0	-	< 1.0
Other Halogenated compounds in SVOC Soil Samples by GC-MS						
1,2-Dichlorobenzene	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7
1,3-Dichlorobenzene	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7
1,4-Dichlorobenzene	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7
Hexachlorobutadiene	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7
Hexachloroethane	mg/kg dry wt	< 0.7	-	< 0.8	-	< 0.7
1,2,4-Trichlorobenzene	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5

Sample Type: Soil						
Sample Name:	MGC_HA10_0.1_	MGC_HA10_0.3_	MGC_HA13_0.1_	MGC_HA13_0.3_	QAQC1	
	O 07-May-2025	O 07-May-2025	O 07-May-2025	O 07-May-2025	07-May-2025	
Lab Number:	3882108.18	3882108.19	3882108.24	3882108.25	3882108.30	
Other compounds in SVOC Soil Samples by GC-MS						
Benzyl alcohol	mg/kg dry wt	< 10	-	< 10	-	< 10
Carbazole	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Dibenzofuran	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Isophorone	mg/kg dry wt	< 0.5	-	< 0.5	-	< 0.5
Sample Name:	MGC_HA08_0.3_	Composite of	Composite of	Composite of	Composite of	
	F 07-May-2025	MGC_HA01_0.0_	MGC_HA01_0.3_	MGC_HA03_0.1_	MGC_HA03_0.3_	
		&	&	G,	G,	
		MGC_HA02_0.1_	MGC_HA02_0.3_	MGC_HA04_0.1_	MGC_HA04_0.3_	
		T	T	G &	G &	
				MGC_HA05_0.1_	MGC_HA05_0.3_	
				G	G	
Lab Number:	3882108.31	3882108.32	3882108.33	3882108.34	3882108.35	
Individual Tests						
Dry Matter	g/100g as rcvd	-	85	-	83	-
pH*	pH Units	-	6.7	6.9	5.7	6.4
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	4	5	4	6
Total Recoverable Cadmium	mg/kg dry wt	-	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	-	8	8	7	8
Total Recoverable Copper	mg/kg dry wt	-	8	3	5	3
Total Recoverable Lead	mg/kg dry wt	-	6.0	4.9	4.9	3.8
Total Recoverable Mercury	mg/kg dry wt	-	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	-	6	6	6	6
Total Recoverable Zinc	mg/kg dry wt	-	34	25	29	25
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	< 0.012	-	< 0.012	-
alpha-BHC	mg/kg dry wt	-	< 0.012	-	< 0.012	-
beta-BHC	mg/kg dry wt	-	< 0.012	-	< 0.012	-
delta-BHC	mg/kg dry wt	-	< 0.012	-	< 0.012	-
gamma-BHC (Lindane)	mg/kg dry wt	-	< 0.012	-	< 0.012	-
cis-Chlordane	mg/kg dry wt	-	< 0.012	-	< 0.012	-
trans-Chlordane	mg/kg dry wt	-	< 0.012	-	< 0.012	-
2,4'-DDD	mg/kg dry wt	-	< 0.012	-	< 0.012	-
4,4'-DDD	mg/kg dry wt	-	< 0.012	-	< 0.012	-
2,4'-DDE	mg/kg dry wt	-	< 0.012	-	< 0.012	-
4,4'-DDE	mg/kg dry wt	-	< 0.012	-	< 0.012	-
2,4'-DDT	mg/kg dry wt	-	< 0.012	-	< 0.012	-
4,4'-DDT	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Total DDT Isomers	mg/kg dry wt	-	< 0.07	-	< 0.08	-
Dieldrin	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Endosulfan I	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Endosulfan II	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Endosulfan sulphate	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Endrin	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Endrin aldehyde	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Endrin ketone	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Heptachlor	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Heptachlor epoxide	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Hexachlorobenzene	mg/kg dry wt	-	< 0.012	-	< 0.012	-
Methoxychlor	mg/kg dry wt	-	< 0.012	-	< 0.012	-

Sample Type: Soil

Sample Name:	Composite of MGC_HA06_0.1_ F, MGC_HA07_0.1_ F, MGC_HA08_0.1_ F & MGC_HA09_0.1_ F	Composite of MGC_HA06_0.3_ F, MGC_HA07_0.3_ F, MGC_HA09_0.3_ F & MGC_HA08_0.3_ F	Composite of MGC_HA14_0.1_ F, MGC_HA15_0.1_ F, MGC_HA16_0.1_ F & MGC_HA17_0.1_ F	Composite of MGC_HA14_0.3_ F, MGC_HA15_0.3_ F, MGC_HA16_0.3_ F & MGC_HA17_0.3_ F	Composite of MGC_HA01_0.0 & MGC_HA02_0.1_ T
Lab Number:	3882108.36	3882108.37	3882108.38	3882108.39	3882108.44

Individual Tests						
pH*	pH Units	6.2	6.4	5.9	6.5	-
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	5	6	5	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	-
Total Recoverable Chromium	mg/kg dry wt	12	12	9	9	-
Total Recoverable Copper	mg/kg dry wt	6	5	3	4	-
Total Recoverable Lead	mg/kg dry wt	12.1	11.2	6.7	7.0	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	-
Total Recoverable Nickel	mg/kg dry wt	8	8	7	7	-
Total Recoverable Zinc	mg/kg dry wt	41	37	30	30	-

Sample Name:	Composite of MGC_HA03_0.1_ G, MGC_HA04_0.1_ G & MGC_HA05_0.1_ G	Composite of MGC_HA06_0.1_ F, MGC_HA07_0.1_ F, MGC_HA08_0.1_ F & MGC_HA09_0.1_ F	Composite of MGC_HA14_0.1_ F, MGC_HA15_0.1_ F, MGC_HA16_0.1_ F & MGC_HA17_0.1_ F	Composite of MGC_HA06_0.1_ F & MGC_HA06_0.3_ F	Composite of MGC_HA08_0.1_ F & MGC_HA08_0.3_ F
Lab Number:	3882108.45	3882108.46	3882108.47	3882108.48	3882108.49

Individual Tests					
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water**	-	-	-	See attached report	See attached report
Poly- and Perfluorinated Alkyl Substances in TCLP pH5 Acetate Buffer**	-	-	-	See attached report	See attached report

Sample Type: Soil

Sample Name:	MGC_HA06_0.1_F 07-May-2025	MGC_HA06_0.3_F 07-May-2025
Lab Number:	3882108.11	3882108.12

PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.022	0.0112
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.023	0.0115
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046

PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

PFAS in Soil - Perfluorosulfonic Acids				
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Soil					
			Sample Name:	MGC_HA06_0.1_F 07-May-2025	MGC_HA06_0.3_F 07-May-2025
			Lab Number:	3882108.11	3882108.12
PFAS in Soil - Perfluorosulfonic Acids					
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.020	0.0102	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	0.0019	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.022	0.0112	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxahexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_HA07_0.1_F 07-May-2025	MGC_HA08_0.1_F 07-May-2025
			Lab Number:	3882108.13	3882108.15
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0021	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	0.0023	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_HA07_0.1_F 07-May-2025	MGC_HA08_0.1_F 07-May-2025
			Lab Number:	3882108.13	3882108.15
PFAS in Soil - Perfluorocarboxylic Acids					
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0020	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0021	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafuoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_HA09_0.1_F 07-May-2025	MGC_HA10_0.1_O 07-May-2025
			Lab Number:	3882108.16	3882108.18
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_HA09_0.1_F 07-May-2025	MGC_HA10_0.1_O 07-May-2025
			Lab Number:	3882108.16	3882108.18
PFAS in Soil - Perfluorocarboxylic Acids					
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFNS	Perfluoronanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_HA10_0.3_O 07-May-2025	MGC_HA13_0.1_O 07-May-2025
			Lab Number:	3882108.19	3882108.24

Sample Type: Soil					
			Sample Name:	MGC_HA10_0.3_O 07-May-2025	MGC_HA13_0.1_O 07-May-2025
			Lab Number:	3882108.19	3882108.24
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	-	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	-	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	-	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	-	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	-	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	-	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	-	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	-	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	-	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	-	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	-	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	-	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	-	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	-	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	-	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	-	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	-	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	-	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	-	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	-	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010	

Sample Type: Soil				
		Sample Name:	MGC_HA10_0.3_O 07-May-2025	MGC_HA13_0.1_O 07-May-2025
		Lab Number:	3882108.19	3882108.24
PFAS in Soil - Miscellaneous				
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	-	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	-	< 0.0010
		Sample Name:	MGC_HA13_0.3_O 07-May-2025	QAQC1 07-May-2025
		Lab Number:	3882108.25	3882108.30
PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	-	< 0.0010
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	-	< 0.046
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	-	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	-	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	-	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	-	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	-	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	-	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	-	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	-	< 0.0010
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	-	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFBs	Perfluorobutanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	-	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	-	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	-	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	-	< 0.0010
NFDHA	Nonafuoro-3,6-dioxaheptanoic acid	mg/kg dry wt	-	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	-	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	-	< 0.0010

Sample Type: Soil					
			Sample Name:	MGC_HA13_0.3_O 07-May-2025	QAQC1 07-May-2025
			Lab Number:	3882108.25	3882108.30
PFAS in Soil - Miscellaneous					
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	-	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	-	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	-	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	-	< 0.0010	
			Sample Name:	MGC_HA08_0.3_F 07-May-2025	Composite of MGC_HA01_0.0 & MGC_HA02_0.1_T
			Lab Number:	3882108.31	3882108.32
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0053	-	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0056	-	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0050	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0053	-	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	

Sample Type: Soil					
			Sample Name:	MGC_HA08_0.3_F 07-May-2025	Composite of MGC_HA01_0.0 & MGC_HA02_0.1_T
			Lab Number:	3882108.31	3882108.32
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-	
			Sample Name:	Composite of MGC_HA14_0.3_F, MGC_HA15_0.3_F, MGC_HA16_0.3_F & MGC_HA17_0.3_F	Composite of MGC_HA01_0.0 & MGC_HA02_0.1_T
			Lab Number:	3882108.39	3882108.44
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	-	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	-	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	-	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	-	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	-	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	-	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	-	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	-	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	-	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	-	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	-	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	-	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	-	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	-	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010	
L-PFNS	Perfluoronanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	-	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	-	< 0.0010	

Sample Type: Soil

Sample Name:	Composite of MGC_HA14_0.3_F, MGC_HA15_0.3_F, MGC_HA16_0.3_F & MGC_HA17_0.3_F	Composite of MGC_HA01_0.0 & MGC_HA02_0.1_T
Lab Number:	3882108.39	3882108.44

PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010

PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	-	< 0.0010

PFAS in Soil - Miscellaneous				
11CI-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	-	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	-	< 0.0010
NFDHA	Nonafuoro-3,6-dioxaheptanoic acid	mg/kg dry wt	-	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	-	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	-	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	-	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	-	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	-	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	-	< 0.0010

Sample Name:	Composite of MGC_HA03_0.1_G, MGC_HA04_0.1_G & MGC_HA05_0.1_G	Composite of MGC_HA06_0.1_F, MGC_HA07_0.1_F, MGC_HA08_0.1_F & MGC_HA09_0.1_F
Lab Number:	3882108.45	3882108.46

PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0051
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	0.0053
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046

PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

PFAS in Soil - Perfluorosulfonic Acids				
L-PFPs	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Soil

		Sample Name:	Composite of MGC_HA03_0.1_G, MGC_HA04_0.1_G & MGC_HA05_0.1_G	Composite of MGC_HA06_0.1_F, MGC_HA07_0.1_F, MGC_HA08_0.1_F & MGC_HA09_0.1_F
		Lab Number:	3882108.45	3882108.46
PFAS in Soil - Perfluorosulfonic Acids				
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0047
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0051
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
		Sample Name:	Composite of MGC_HA14_0.1_F, MGC_HA15_0.1_F, MGC_HA16_0.1_F & MGC_HA17_0.1_F	Composite of MGC_HA06_0.1_F & MGC_HA06_0.3_F
		Lab Number:	3882108.47	3882108.48
PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	-
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-

Sample Type: Soil					
			Sample Name:	Composite of MGC_HA14_0.1_F, MGC_HA15_0.1_F, MGC_HA16_0.1_F & MGC_HA17_0.1_F	Composite of MGC_HA06_0.1_F & MGC_HA06_0.3_F
			Lab Number:	3882108.47	3882108.48
PFAS in Soil - Perfluorocarboxylic Acids					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPs	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-	
NFDHA	Nonafuoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-	

Analyst's Comments

‡ Analysis subcontracted to an external provider. Refer to the Summary of Methods section for more details.

Amended Report: This certificate of analysis replaces report '3882108-SPv3' issued on 17-Jun-2025 at 2:32 pm. Reason for amendment: Additional testing added as per clients request.

Appendix No.1 - AsureQuality Report

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).	-	18-19, 24-25, 30, 32-39
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	18-19, 24-25, 30, 32-39
Soil Prep Dry & Sieve for Agriculture	Air dried at 35°C and sieved, <2mm fraction.	-	18-19, 24-25, 30, 32-39
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water*	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	48-49
Poly- and Perfluorinated Alkyl Substances in TCLP pH5 Acetate Buffer*	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	48-49
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	18, 24, 30, 32, 34
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).	0.10 g/100g as rcvd	11-13, 15-16, 18, 24, 30-31, 44-47
Composite PFAS Sample*	Individual sample fractions mixed together to form a composite fraction.	-	1, 3, 5, 7, 9, 11, 13, 15-16, 26, 28, 40, 42
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	1-17, 26-29, 31, 40-43
pH*	1:2 (v/v) soil : water slurry followed by potentiometric determination of pH. In-house.	0.1 pH Units	18-19, 24-25, 30, 32-39
Heavy Metals with Mercury, 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	18-19, 24-25, 30, 32-39
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	32, 34
Semivolatle 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	18, 24, 30
PFAS in Soil	Solvent extraction. LC-MS/MS analysis. Tested on as received sample. In-house based on ASTM D7968.	0.0010 - 0.046 mg/kg dry wt	11-13, 15-16, 18, 24, 30-31, 44-47

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

Testing was completed between 19-May-2025 and 21-Jul-2025. For completion dates of individual analyses please contact the laboratory.

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

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Kim Harrison MSc
Client Services Manager - Environmental



AsureQuality Limited | 1C Quadrant Drive | Waiwhetu | Lower Hutt 5010 | Wellington | New Zealand
 PO Box 31242 | Lower Hutt 5040 | Wellington | New Zealand
 t. +64 4 570 8800 | e. testing@asurequality.com | w. www.asurequality.com

Certificate of Analysis

Submission Reference: EnvSubAQ_LH 1396

Final Report

Environment Client Service Managers
 Hill Laboratories - Hamilton
 Private Bag 3205
 Hamilton 3240
 New Zealand

Pre-registration ID: VJm-gYu-LQu

Submitted by:
 Hill Laboratories- Parent
 Private Bag 3205
 Hamilton 3240
 New Zealand

Report Issued: 19-Jul-2025

AsureQuality Reference: 25-179563

Sample(s) Received: 05-Jul-2025 08:38

Testing Period: 07-Jul-2025 to 18-Jul-2025

Date of analysis is available on request.

Sample Summary

Customer Sample Name: MGC_HA06_0.1_F Lab ID: 25-179563-1

Sample Description: 3882108.11

Sample Condition: Acceptable

Sampled Date: 07-May-2025

Customer Sample Name: MGC_HA06_0.3_F Lab ID: 25-179563-2

Sample Description: 3882108.12

Sample Condition: Acceptable

Sampled Date: 07-May-2025

Customer Sample Name: MGC_HA08_0.1_F Lab ID: 25-179563-3

Sample Description: 3882108.15

Sample Condition: Acceptable

Sampled Date: 07-May-2025

Customer Sample Name: MGC_HA08_0.3_F Lab ID: 25-179563-4

Sample Description: 3882108.31

Sample Condition: Acceptable

Sampled Date: 07-May-2025

Composition

Composite ID	Composition
25-179563-5	25-179563-1, 25-179563-2
25-179563-6	25-179563-3, 25-179563-4

Results

The tests were performed on the samples as received.

Customer Sample Name: Composite of MGC_HA06_0.1_F & MGC_HA06_0.3_F Lab ID: 25-179563-5

Sample Description: 3882108.48

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Ltd has used reasonable skill, care, and effort to provide an accurate analysis of the sample(s) which form(s) the subject of this report. However, the accuracy of this analysis is reliant on, and subject to, the sample(s) provided by you and your responsibility as to transportation of the sample(s). AsureQuality Ltd's standard terms of business apply to the analysis set out in this report: <https://www.asurequality.com/about/terms-of-business/>

Report Number: 4323188

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Test	Result	Unit	Method Reference
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.32	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.32	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.32	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	104	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
M3PFHxS	106	%	AsureQuality Method (LC-MS/MS)
M8PFOS	106	%	AsureQuality Method (LC-MS/MS)
M4PFBA	107	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	104	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	104	%	AsureQuality Method (LC-MS/MS)
M8PFOA	103	%	AsureQuality Method (LC-MS/MS)
M9PFNA	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA	108	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	106	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	104	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	108	%	AsureQuality Method (LC-MS/MS)
MPFOSA	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	109	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	99	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	109	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	107	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	100	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	94	%	AsureQuality Method (LC-MS/MS)

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - pH5 Acetate Buffer

Perfluoroalkylsulfonic acids

PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	0.033	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.22	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.25	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.25	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Perfluoroalkylcarboxylic acids

PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	107	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	105	%	AsureQuality Method (LC-MS/MS)
M8PFOS	105	%	AsureQuality Method (LC-MS/MS)
M4PFBA	106	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	107	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	108	%	AsureQuality Method (LC-MS/MS)
M8PFOA	102	%	AsureQuality Method (LC-MS/MS)
M9PFNA	95	%	AsureQuality Method (LC-MS/MS)
M6PFDA	111	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	109	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	110	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	130	%	AsureQuality Method (LC-MS/MS)
MPFOSA	105	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	111	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	109	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	104	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	109	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	108	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-179563

Report Issued: 19-Jul-2025

Test	Result	Unit	Method Reference
DNMeFOSE	108	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	94	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	93	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	93	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Composite of MGC_HA08_0.1_F & MGC_HA08_0.3_F

Lab ID: 25-179563-6

Sample Description: 3882108.49

Test	Result	Unit	Method Reference
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Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water**Perfluoroalkylsulfonic acids**

PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.18	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.18	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.18	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Perfluoroalkylcarboxylic acids

PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamides

PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamidoethanols

NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

Report Number: 4323188

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Test	Result	Unit	Method Reference
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	109	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	101	%	AsureQuality Method (LC-MS/MS)
M8PFOS	105	%	AsureQuality Method (LC-MS/MS)
M4PFBA	106	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	104	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	104	%	AsureQuality Method (LC-MS/MS)
MPFHpA	105	%	AsureQuality Method (LC-MS/MS)
M8PFOA	107	%	AsureQuality Method (LC-MS/MS)
M9PFNA	102	%	AsureQuality Method (LC-MS/MS)
M6PFDA	104	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	101	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	103	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	106	%	AsureQuality Method (LC-MS/MS)
MPFOSA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	109	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	106	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	98	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	100	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	114	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	98	%	AsureQuality Method (LC-MS/MS)
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - pH5 Acetate Buffer			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.13	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.13	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.13	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanois			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	102	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	102	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-179563

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Test	Result	Unit	Method Reference
M8PFOS	103	%	AsureQuality Method (LC-MS/MS)
M4PFBA	104	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	106	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	107	%	AsureQuality Method (LC-MS/MS)
M8PFOA	106	%	AsureQuality Method (LC-MS/MS)
M9PFNA	97	%	AsureQuality Method (LC-MS/MS)
M6PFDA	109	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	123	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	113	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	123	%	AsureQuality Method (LC-MS/MS)
MPFOA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOA	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOA	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOAA	112	%	AsureQuality Method (LC-MS/MS)
DNMeFOAA	113	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	103	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	99	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	89	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Duplicate of 25-179563-5A

Lab ID: 25-179563-7

Sample Description: 27656945_Duplicate

Sample Condition: Acceptable

Sampled Date: 07-May-2025

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - pH5 Acetate Buffer			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	0.029	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.23	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.26	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.26	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	101	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	106	%	AsureQuality Method (LC-MS/MS)
M8PFOS	107	%	AsureQuality Method (LC-MS/MS)
M4PFBA	104	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	105	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	105	%	AsureQuality Method (LC-MS/MS)
MPFHpA	105	%	AsureQuality Method (LC-MS/MS)
M8PFOA	105	%	AsureQuality Method (LC-MS/MS)
M9PFNA	97	%	AsureQuality Method (LC-MS/MS)
M6PFDA	107	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	101	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	103	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	98	%	AsureQuality Method (LC-MS/MS)
MPFOSA	101	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	100	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-179563

Report Issued: 19-Jul-2025

Test	Result	Unit	Method Reference
DNEtFOSAA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	99	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	97	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	93	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	100	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	88	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Duplicate.of 25-179563-6A

Lab ID: 25-179563-8

Sample Description: 27656947_Duplicate

Sample Condition: Acceptable

Sampled Date: 07-May-2025

Test	Result	Unit	Method Reference
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Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water

Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.15	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.15	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.15	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	103	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	102	%	AsureQuality Method (LC-MS/MS)
M8PFOS	105	%	AsureQuality Method (LC-MS/MS)
M4PFBA	106	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	104	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	101	%	AsureQuality Method (LC-MS/MS)
MPFHpA	102	%	AsureQuality Method (LC-MS/MS)
M8PFOA	105	%	AsureQuality Method (LC-MS/MS)
M9PFNA	105	%	AsureQuality Method (LC-MS/MS)
M6PFDA	103	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	106	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	99	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	105	%	AsureQuality Method (LC-MS/MS)
MPFOSA	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	102	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	108	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	107	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	90	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	107	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	90	%	AsureQuality Method (LC-MS/MS)

QC Results

Blank

Relates to sample(s) 25-179563-5, 25-179563-6, 25-179563-7

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - pH5 Acetate Buffer			
Perfluoroalkylsulfonic acids			
PFPtS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	102	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	101	%	AsureQuality Method (LC-MS/MS)
M8PFOS	105	%	AsureQuality Method (LC-MS/MS)
M4PFBA	103	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	101	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	102	%	AsureQuality Method (LC-MS/MS)
M8PFOA	100	%	AsureQuality Method (LC-MS/MS)
M9PFNA	98	%	AsureQuality Method (LC-MS/MS)
M6PFDA	102	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	103	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	102	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	94	%	AsureQuality Method (LC-MS/MS)
MPFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	97	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	98	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	107	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	107	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	87	%	AsureQuality Method (LC-MS/MS)

Blank

Relates to sample(s) 25-179563-5, 25-179563-6, 25-179563-8

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPoS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-179563

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Test	Result	Unit	Method Reference
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	103	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	103	%	AsureQuality Method (LC-MS/MS)
M8PFOS	110	%	AsureQuality Method (LC-MS/MS)
M4PFBA	105	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	105	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	102	%	AsureQuality Method (LC-MS/MS)
MPFHpA	100	%	AsureQuality Method (LC-MS/MS)
M8PFOA	102	%	AsureQuality Method (LC-MS/MS)
M9PFNA	101	%	AsureQuality Method (LC-MS/MS)
M6PFDA	103	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	103	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	100	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	106	%	AsureQuality Method (LC-MS/MS)
MPFOSA	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	97	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	109	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	93	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	86	%	AsureQuality Method (LC-MS/MS)

Analysis Summary

Wellington Laboratory

Analysis	Method	Authorised by
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water		
DX-PFCS02, 06-TCLP_W	AsureQuality Method (LC-MS/MS)	Christopher Sampson

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery.

In house protocol based on US EPA 1311 test Toxicity Characteristic Leaching Procedure (TCLP).

AsureQuality Reference: 25-179563**Report Issued: 19-Jul-2025**

Analysis	Method	Authorised by
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - pH5 Acetate Buffer DX-PFCS02, 07-TCLP_B	AsureQuality Method (LC-MS/MS)	Christopher Sampson

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery.

In house protocol based on US EPA 1311 test Toxicity Characteristic Leaching Procedure (TCLP).

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.



Christopher Sampson
Scientist

Appendix

Analyte LOR Summary

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water - AsureQuality Method (LC-MS/MS)

Analyte LOR

Listing applies to samples: 25-179563-5, 25-179563-6, 25-179563-8

Perfluoroalkylsulfonic acids

PFPrS	0.025 µg/L
PFBS	0.025 µg/L
PFPeS	0.025 µg/L
di-PFHxS (1)	0.025 µg/L
mono-PFHxS (1)	0.025 µg/L
L-PFHxS (1)	0.025 µg/L
Total PFHxS (3)	0.025 µg/L
PFHpS	0.025 µg/L
di-PFOS (5)	0.025 µg/L
mono-PFOS (5)	0.025 µg/L
L-PFOS (5)	0.025 µg/L
Total PFOS (7)	0.025 µg/L
Sum PFHxS+PFOS (1)	0.025 µg/L
PFNS	0.050 µg/L
PFDS	0.10 µg/L
PFECHS	0.025 µg/L

Perfluoroalkylcarboxylic acids

PFBA	0.10 µg/L
PFPeA	0.10 µg/L
PFHxA	0.025 µg/L
PFHpA	0.025 µg/L
PFOA	0.025 µg/L
PFNA	0.025 µg/L
PFDA	0.025 µg/L
PFUnDA	0.025 µg/L
PFDoDA	0.10 µg/L
PFTrDA	0.10 µg/L
PFTeDA	0.10 µg/L
P37DMOA	0.050 µg/L

Perfluorooctanesulfonamides

PFOSA	0.025 µg/L
NEtFOSA-M	0.10 µg/L
NMeFOSA-M	0.10 µg/L

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	0.025 µg/L
NMeFOSAA	0.025 µg/L

Perfluorooctanesulfonamidoethanols

NEtFOSE-M	0.10 µg/L
NMeFOSE-M	0.10 µg/L

Telomere Sulfonic acids

4:2 FTS	0.025 µg/L
6:2 FTS	0.050 µg/L
8:2 FTS	0.10 µg/L
10:2 FTS	0.025 µg/L

Telomere Carboxylic acids

FPrPA (3:3FTA)	0.10 µg/L
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AsureQuality Reference: 25-179563

FPePA (5:3FTA)	0.025 µg/L
FHpPA (7:3FTA)	0.025 µg/L
Miscellaneous	
F-53B (major)	0.10 µg/L
F-53B (minor)	0.050 µg/L
Sum F-53B	0.1 µg/L
ADONA	0.025 µg/L
HFPO-DA (GenX)	0.050 µg/L

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - pH5 Acetate Buffer - AsureQuality Method (LC-MS/MS)**Analyte LOR**

Listing applies to samples: 25-179563-5, 25-179563-6, 25-179563-7

Perfluoroalkylsulfonic acids

PFPPrS	0.025 µg/L
PFBS	0.025 µg/L
PFPeS	0.025 µg/L
di-PFHxS (1)	0.025 µg/L
mono-PFHxS (1)	0.025 µg/L
L-PFHxS (1)	0.025 µg/L
Total PFHxS (3)	0.025 µg/L
PFHpS	0.025 µg/L
di-PFOS (5)	0.025 µg/L
mono-PFOS (5)	0.025 µg/L
L-PFOS (5)	0.025 µg/L
Total PFOS (7)	0.025 µg/L
Sum PFHxS+PFOS (1)	0.025 µg/L
PFNS	0.050 µg/L
PFDS	0.10 µg/L
PFECHS	0.025 µg/L

Perfluoroalkylcarboxylic acids

PFBA	0.10 µg/L
PFPeA	0.10 µg/L
PFHxA	0.025 µg/L
PFHpA	0.025 µg/L
PFOA	0.025 µg/L
PFNA	0.025 µg/L
PFDA	0.025 µg/L
PFUnDA	0.025 µg/L
PFDoDA	0.10 µg/L
PFTTrDA	0.10 µg/L
PFTeDA	0.10 µg/L
P37DMOA	0.050 µg/L

Perfluorooctanesulfonamides

PFOSA	0.025 µg/L
NEtFOSA-M	0.10 µg/L
NMeFOSA-M	0.10 µg/L

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	0.025 µg/L
NMeFOSAA	0.025 µg/L

Perfluorooctanesulfonamidoethanols

NEtFOSE-M	0.10 µg/L
NMeFOSE-M	0.10 µg/L

Telomere Sulfonic acids

4:2 FTS	0.025 µg/L
6:2 FTS	0.050 µg/L
8:2 FTS	0.10 µg/L
10:2 FTS	0.025 µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.10 µg/L
FPePA (5:3FTA)	0.025 µg/L
FHpPA (7:3FTA)	0.025 µg/L
Miscellaneous	
F-53B (major)	0.10 µg/L
F-53B (minor)	0.050 µg/L
Sum F-53B	0.1 µg/L
ADONA	0.025 µg/L
HFPO-DA (GenX)	0.050 µg/L

Analyte Definitions

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
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Listing applies to samples: 25-179563-5, 25-179563-6, 25-179563-8

Perfluoroalkylsulfonic acids

PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid

Perfluoroalkylcarboxylic acids

PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid

Perfluorooctanesulfonamides

PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid

Perfluorooctanesulfonamidoethanols

Analyte	Full Name
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decane sulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecane sulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafuoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNtFOsAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOsAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - pH5 Acetate Buffer - AsureQuality Method (LC-MS/MS)

Analyte Full Name

Listing applies to samples: 25-179563-5, 25-179563-6, 25-179563-7

Perfluoroalkylsulfonic acids

PFPPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanefulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids

Analyte	Full Name
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoroproxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid

Analyte	Full Name
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

LOR = Limit of Reporting

LOD = Limit of Detection

NR = Not Reportable

Certificate of Analysis

Page 1 of 15

Client:	Beca Limited	Lab No:	3939403	SPV5
Contact:	Tyler Neve C/- Beca Limited PO Box 3942 Wellington 6140	Date Received:	16-Jul-2025	
		Date Reported:	06-Oct-2025	
		Quote No:	96766	
		Order No:	3324338	
		Client Reference:	Miramar Golf Course	
		Add. Client Ref:	Date sampled: 16/7/25	
		Submitted By:	Mio Akiyama	

Sample Type: Soil

Sample Name:	MGC_TP01_0.0	MGC_TP02_0.0	MGC_TP03_0.0	MGC_TP04_0.0	MGC_TP05_0.0
16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025
Lab Number:	3939403.1	3939403.5	3939403.9	3939403.13	3939403.17

Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	5	4	4	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	6	8	8	8	8
Total Recoverable Copper	mg/kg dry wt	3	< 2	< 2	2	2
Total Recoverable Lead	mg/kg dry wt	3.8	4.5	3.0	4.5	4.1
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	5	6	6	6	7
Total Recoverable Zinc	mg/kg dry wt	24	23	22	26	26

Sample Name:	MGC_TP06_0.0	MGC_TP07_0.0	MGC_TP08_0.0	MGC_TP09_0.0	MGC_TP09_0.3
16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025
Lab Number:	3939403.21	3939403.25	3939403.29	3939403.33	3939403.34

Individual Tests					
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water**	-	-	-	See attached report	-

Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	5	4	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	-	-
Total Recoverable Chromium	mg/kg dry wt	8	9	7	-	-
Total Recoverable Copper	mg/kg dry wt	3	4	3	-	-
Total Recoverable Lead	mg/kg dry wt	7.3	7.1	5.6	-	-
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.10	-	-
Total Recoverable Nickel	mg/kg dry wt	6	7	6	-	-
Total Recoverable Zinc	mg/kg dry wt	30	34	26	-	-

Sample Name:	MGC_TP09_0.5	MGC_TP09_1.0	MGC_TP10_0.0	MGC_TP11_0.0	MGC_TP11_0.3
16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025	16-Jul-2025
Lab Number:	3939403.35	3939403.36	3939403.37	3939403.41	3939403.42

Individual Tests						
Dry Matter	g/100g as rcvd	87	94	-	-	85

Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	-	-	-	5
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	-	-	-	< 0.10
Total Recoverable Chromium	mg/kg dry wt	18	-	-	-	14
Total Recoverable Copper	mg/kg dry wt	7	-	-	-	7
Total Recoverable Lead	mg/kg dry wt	16.1	-	-	-	14.0
Total Recoverable Mercury	mg/kg dry wt	< 0.10	-	-	-	< 0.10
Total Recoverable Nickel	mg/kg dry wt	8	-	-	-	9
Total Recoverable Zinc	mg/kg dry wt	46	-	-	-	47



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:	MGC_TP09_0.5 16-Jul-2025	MGC_TP09_1.0 16-Jul-2025	MGC_TP10_0.0 16-Jul-2025	MGC_TP11_0.0 16-Jul-2025	MGC_TP11_0.3 16-Jul-2025
Lab Number:	3939403.35	3939403.36	3939403.37	3939403.41	3939403.42

Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	-	-	< 0.3
1-Methylnaphthalene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
2-Methylnaphthalene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Acenaphthylene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Acenaphthene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Anthracene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Benzo[a]anthracene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.027	-	-	-	< 0.028
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.027	-	-	-	< 0.028
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.011	-	-	-	0.013
Benzo[e]pyrene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Benzo[k]fluoranthene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Chrysene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Fluoranthene	mg/kg dry wt	< 0.011	-	-	-	0.016
Fluorene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Naphthalene	mg/kg dry wt	< 0.06	-	-	-	< 0.06
Perylene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Phenanthrene	mg/kg dry wt	< 0.011	-	-	-	< 0.012
Pyrene	mg/kg dry wt	< 0.011	-	-	-	0.017

Sample Name:	MGC_TP11_0.5 16-Jul-2025	MGC_TP11_1.0 16-Jul-2025	MGC_TP12_0.0 16-Jul-2025	MGC_TP12_1.0 16-Jul-2025	QAQC1 16-Jul-2025
Lab Number:	3939403.43	3939403.44	3939403.45	3939403.48	3939403.49

Individual Tests						
Dry Matter	g/100g as rcvd	88	89	-	88	-
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	-	-	-	5
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	-	-	-	< 0.10
Total Recoverable Chromium	mg/kg dry wt	13	-	-	-	9
Total Recoverable Copper	mg/kg dry wt	13	-	-	-	4
Total Recoverable Lead	mg/kg dry wt	25	-	-	-	7.8
Total Recoverable Mercury	mg/kg dry wt	< 0.10	-	-	-	< 0.10
Total Recoverable Nickel	mg/kg dry wt	11	-	-	-	7
Total Recoverable Zinc	mg/kg dry wt	63	-	-	-	32

Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.012	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.012	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.012	-	-	-	-
Acenaphthene	mg/kg dry wt	< 0.012	-	-	-	-
Anthracene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.028	-	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.028	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.012	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.012	-	-	-	-

Sample Type: Soil

Sample Name:	MGC_TP11_0.5 16-Jul-2025	MGC_TP11_1.0 16-Jul-2025	MGC_TP12_0.0 16-Jul-2025	MGC_TP12_1.0 16-Jul-2025	QAQC1 16-Jul-2025
Lab Number:	3939403.43	3939403.44	3939403.45	3939403.48	3939403.49

Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.012	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.012	-	-	-
Chrysene	mg/kg dry wt	< 0.012	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.012	-	-	-
Fluoranthene	mg/kg dry wt	< 0.012	-	-	-
Fluorene	mg/kg dry wt	< 0.012	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.012	-	-	-
Naphthalene	mg/kg dry wt	< 0.06	-	-	-
Perylene	mg/kg dry wt	< 0.012	-	-	-
Phenanthrene	mg/kg dry wt	< 0.012	-	-	-
Pyrene	mg/kg dry wt	< 0.012	-	-	-

Sample Type: Aqueous

Sample Name:	Rinsate1
Lab Number:	3939403.50

Individual Tests	
Poly- and Perfluorinated Alkyl Substances in Water**	See attached report

Sample Type: Soil

Sample Name:	MGC_TP01_0.0 16-Jul-2025	MGC_TP02_0.0 16-Jul-2025
Lab Number:	3939403.1	3939403.5

PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	< 0.0010
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046

PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

PFAS in Soil - Perfluorosulfonic Acids				
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Soil					
			Sample Name:	MGC_TP01_0.0 16-Jul-2025	MGC_TP02_0.0 16-Jul-2025
			Lab Number:	3939403.1	3939403.5
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP03_0.0 16-Jul-2025	MGC_TP04_0.0 16-Jul-2025
			Lab Number:	3939403.9	3939403.13
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP03_0.0 16-Jul-2025	MGC_TP04_0.0 16-Jul-2025
			Lab Number:	3939403.9	3939403.13
PFAS in Soil - Perfluorosulfonic Acids					
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP05_0.0 16-Jul-2025	MGC_TP06_0.0 16-Jul-2025
			Lab Number:	3939403.17	3939403.21
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP05_0.0 16-Jul-2025	MGC_TP06_0.0 16-Jul-2025
			Lab Number:	3939403.17	3939403.21
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP07_0.0 16-Jul-2025	MGC_TP08_0.0 16-Jul-2025
			Lab Number:	3939403.25	3939403.29
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP07_0.0 16-Jul-2025	MGC_TP08_0.0 16-Jul-2025
			Lab Number:	3939403.25	3939403.29
PFAS in Soil - Perfluorocarboxylic Acids					
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP09_0.0 16-Jul-2025	MGC_TP09_0.3 16-Jul-2025
			Lab Number:	3939403.33	3939403.34
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0020	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0021	< 0.0010	

Sample Type: Soil				
		Sample Name:	MGC_TP09_0.0 16-Jul-2025	MGC_TP09_0.3 16-Jul-2025
		Lab Number:	3939403.33	3939403.34
PFAS in Soil - Summary				
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0015	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0020	< 0.0010
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Soil				
		Sample Name:	MGC_TP09_0.5 16-Jul-2025	MGC_TP09_1.0 16-Jul-2025
		Lab Number:	3939403.35	3939403.36
PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	-	< 0.0010
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	-	< 0.046
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	-	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	-	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	-	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	-	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	-	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	-	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	-	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	-	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	-	< 0.0010
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	-	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	-	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	-	< 0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	-	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	-	< 0.0010
L-PFNS	Perfluoronanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	-	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomer carboxylic acid	mg/kg dry wt	-	< 0.0010
5:3 FTCA	5:3 Fluorotelomer carboxylic acid	mg/kg dry wt	-	< 0.0010
7:3 FTCA	7:3 Fluorotelomer carboxylic acid	mg/kg dry wt	-	< 0.0010
PFAS in Soil - Miscellaneous				
11CI-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	-	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	-	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	-	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	-	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	-	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	-	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	-	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	-	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	-	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	-	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010

Sample Type: Soil				
		Sample Name:	MGC_TP09_0.5 16-Jul-2025	MGC_TP09_1.0 16-Jul-2025
		Lab Number:	3939403.35	3939403.36
PFAS in Soil - Miscellaneous				
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	-	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	-	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	-	< 0.0010
		Sample Name:	MGC_TP10_0.0 16-Jul-2025	MGC_TP11_0.0 16-Jul-2025
		Lab Number:	3939403.37	3939403.41
PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0146
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	0.0154
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0137
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0146
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Soil					
			Sample Name:	MGC_TP10_0.0 16-Jul-2025	MGC_TP11_0.0 16-Jul-2025
			Lab Number:	3939403.37	3939403.41
PFAS in Soil - Miscellaneous					
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP11_0.3 16-Jul-2025	MGC_TP11_0.5 16-Jul-2025
			Lab Number:	3939403.42	3939403.43
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0181	0.039	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0194	0.040	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.048	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPpS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	0.0012	0.0012	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	0.0013	0.0013	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0170	0.027	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	0.0011	0.0120	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0181	0.039	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP11_0.3 16-Jul-2025	MGC_TP11_0.5 16-Jul-2025
			Lab Number:	3939403.42	3939403.43
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP11_1.0 16-Jul-2025	MGC_TP12_0.0 16-Jul-2025
			Lab Number:	3939403.44	3939403.45
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.029	0.0063	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.030	0.0064	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.048	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPs	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.017	0.0058	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	0.0120	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.029	0.0063	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP11_1.0 16-Jul-2025	MGC_TP12_0.0 16-Jul-2025
			Lab Number:	3939403.44	3939403.45
PFAS in Soil - Fluorotelomer Sulfonic Acids					
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP12_1.0 16-Jul-2025	QAQC1 16-Jul-2025
			Lab Number:	3939403.48	3939403.49
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	-	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPs	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	

Sample Type: Soil				
		Sample Name:	MGC_TP12_1.0 16-Jul-2025	QAQC1 16-Jul-2025
		Lab Number:	3939403.48	3939403.49
PFAS in Soil - Perfluorosulfonic Acids				
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-

Analyst's Comments

* Analysis subcontracted to an external provider. Refer to the Summary of Methods section for more details.

Appendix No.1 - AsureQuality Report

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, 9, 13, 17, 21, 25, 29, 35, 42-43, 49
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	35, 42-43
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water*	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	33
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	35-36, 42-44, 48

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).	0.10 g/100g as rcvd	1, 5, 9, 13, 17, 21, 25, 29, 33-34, 37, 41-42, 45
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	35, 42-43
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	35, 42-43
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. US EPA 200.2 (modified), APHA 3125 B: Online Edition.	0.10 - 4 mg/kg dry wt	1, 5, 9, 13, 17, 21, 25, 29, 35, 42-43, 49
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	35, 42-43
PFAS in Soil	Solvent extraction. LC-MS/MS analysis. Tested on as received sample. In-house based on ASTM D7968.	0.0010 - 0.046 mg/kg dry wt	1, 5, 9, 13, 17, 21, 25, 29, 33-34, 36-37, 41-45, 48

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Poly- and Perfluorinated Alkyl Substances in Water*	Analysis by LC-MS/MS. Subcontracted toASUREQuality, Lower Hutt.	-	50

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

Testing was completed between 19-Jul-2025 and 06-Oct-2025. For completion dates of individual analyses please contact the laboratory.

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

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



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

Certificate of Analysis

Submission Reference: **EnvSubAQ_LH 1412**

Final Report

Pre-registration ID: deE-IBs-VdW

PO Number: XXXXXXXXXX

Hill Subcontracting
Hill Laboratories - Hamilton
Private Bag 3205
Hamilton 3240
New Zealand

Report Issued: 07-Aug-2025

AsureQuality Reference: **25-200085**

Sample(s) Received: 24-Jul-2025 08:45

Testing Period: 24-Jul-2025 to 01-Aug-2025

Date of analysis is available on request.

Results

The tests were performed on the samples as received.

Customer Sample Name: MGC_TP09_0.0		Lab ID: 25-200085-1	
Sample Description: 3939403.33			
Sample Condition: Acceptable		Sampled Date: 16-Jul-2025	
Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPoS *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPoS *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5) *	0.049	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7) *	0.049	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1) *	0.049	µg/L	AsureQuality Method (LC-MS/MS)
PFNS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Ltd has used reasonable skill, care, and effort to provide an accurate analysis of the sample(s) which form(s) the subject of this report. However, the accuracy of this analysis is reliant on, and subject to, the sample(s) provided by you and your responsibility as to transportation of the sample(s). AsureQuality Ltd's standard terms of business apply to the analysis set out in this report: <https://www.asurequality.com/about/terms-of-business/>

Test	Result	Unit	Method Reference
PFUnDA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA) *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA) *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major) *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor) *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B *	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA *	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX) *	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS *	100	%	AsureQuality Method (LC-MS/MS)
M3PFHxS *	101	%	AsureQuality Method (LC-MS/MS)
M8PFOS *	99	%	AsureQuality Method (LC-MS/MS)
M4PFBA *	101	%	AsureQuality Method (LC-MS/MS)
M5PFPeA *	101	%	AsureQuality Method (LC-MS/MS)
M5PFHxA *	106	%	AsureQuality Method (LC-MS/MS)
MPFHpA *	108	%	AsureQuality Method (LC-MS/MS)
M8PFOA *	102	%	AsureQuality Method (LC-MS/MS)
M9PFNA *	95	%	AsureQuality Method (LC-MS/MS)
M6PFDA *	99	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA *	99	%	AsureQuality Method (LC-MS/MS)
MPFDoDA *	97	%	AsureQuality Method (LC-MS/MS)
MPFTeDA *	94	%	AsureQuality Method (LC-MS/MS)
MPFOSA *	101	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA *	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA *	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA *	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA *	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE *	101	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-200085

Report Issued: 07-Aug-2025

Test	Result	Unit	Method Reference
DNMeFOSE *	98	%	AsureQuality Method (LC-MS/MS)
M4:2FTS *	97	%	AsureQuality Method (LC-MS/MS)
M6:2FTS *	100	%	AsureQuality Method (LC-MS/MS)
M8:2FTS *	91	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA *	88	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Rinsate1

Lab ID: 25-200085-2

Sample Description: 3939403.50

Sample Condition: Acceptable

Sampled Date: 16-Jul-2025

Test	Result	Unit	Method Reference
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Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water**Perfluoroalkylsulfonic acids**

PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)

Perfluoroalkylcarboxylic acids

PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
P37DMA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamides

PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamidoethanols

NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
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AsureQuality Reference: 25-200085

Report Issued: 07-Aug-2025

Test	Result	Unit	Method Reference
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	NR	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	NR	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010 (P)	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	110	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	121	%	AsureQuality Method (LC-MS/MS)
M8PFOS	168 (R)	%	AsureQuality Method (LC-MS/MS)
M4PFBA	104	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	106	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	107	%	AsureQuality Method (LC-MS/MS)
MPFHpA	112	%	AsureQuality Method (LC-MS/MS)
M8PFOA	116	%	AsureQuality Method (LC-MS/MS)
M9PFNA	138	%	AsureQuality Method (LC-MS/MS)
M6PFDA	151 (R)	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	185 (R)	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	278 (R)	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	259 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	107	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	113	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	178 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	142	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	111	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	106	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	116	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	156 (R)	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	93	%	AsureQuality Method (LC-MS/MS)

P = Partial result - one or more individual components could not be reported

R = Recovery outside method limits

Customer Sample Name: Duplicate of 25-200085-2A

Lab ID: 25-200085-3

Sample Description: Rinsate 1 Duplicate

Sample Condition: Acceptable

Sampled Date: 16-Jul-2025

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPoS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	NR	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	NR	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
Sum F-53B	<0.0010 (P)	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	110	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	121	%	AsureQuality Method (LC-MS/MS)
M8PFOS	162 (R)	%	AsureQuality Method (LC-MS/MS)
M4PFBA	102	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	103	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	109	%	AsureQuality Method (LC-MS/MS)
M8PFOA	116	%	AsureQuality Method (LC-MS/MS)
M9PFNA	132	%	AsureQuality Method (LC-MS/MS)
M6PFDA	152 (R)	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	183 (R)	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	286 (R)	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	252 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	87	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	94	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	172 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	143	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	93	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	111	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	146	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	93	%	AsureQuality Method (LC-MS/MS)

P = Partial result - one or more individual components could not be reported

R = Recovery outside method limits

QC Results

Blank

Relates to sample(s) 25-200085-1

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	101	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	99	%	AsureQuality Method (LC-MS/MS)
M8PFOS	100	%	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
M4PFBA	100	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	99	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	102	%	AsureQuality Method (LC-MS/MS)
MPFHpA	108	%	AsureQuality Method (LC-MS/MS)
M8PFOA	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA	105	%	AsureQuality Method (LC-MS/MS)
M6PFDA	103	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	107	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	103	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	101	%	AsureQuality Method (LC-MS/MS)
MPFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	101	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	98	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	103	%	AsureQuality Method (LC-MS/MS)

Blank

Relates to sample(s) 25-200085-2, 25-200085-3

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPoS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	100	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	112	%	AsureQuality Method (LC-MS/MS)
M8PFOS	133	%	AsureQuality Method (LC-MS/MS)
M4PFBA	100	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	101	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	103	%	AsureQuality Method (LC-MS/MS)
M8PFOA	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA	97	%	AsureQuality Method (LC-MS/MS)
M6PFDA	127	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	138	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	193 (R)	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	168 (R)	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
MPFOSA	99	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	93	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	94	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	133	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	116	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	99	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	92	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	100	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	108	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	95	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Analysis Summary

Wellington Laboratory

Analysis	Method	Accreditation	Authorised by
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
DX-PFCS01, 03-SUITE_B	AsureQuality Method (LC-MS/MS)	IANZ	Christopher Sampson

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water

DX-PFCS02, 06-TCLP_W	AsureQuality Method (LC-MS/MS)	Not Accredited	Christopher Sampson
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di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery.

In house protocol based on US EPA 1311 test Toxicity Characteristic Leaching Procedure (TCLP).

Any tests marked with * are not accredited for specific matrices or analytes.

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.

NR = Not Reportable



Christopher Sampson
Scientist

Accreditation



Appendix

Analyte LOR Summary

Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water - AsureQuality Method (LC-MS/MS)

Analyte	LOR
Listing applies to samples: 25-200085-2, 25-200085-3	
Perfluoroalkylsulfonic acids	
PFPoS	0.0010 µg/L
PFBS	0.0010 µg/L
PFPeS	0.0010 µg/L
di-PFHxS (1)	0.0010 µg/L
mono-PFHxS (1)	0.0010 µg/L
L-PFHxS (1)	0.0010 µg/L
Total PFHxS (3)	0.0010 µg/L
PFHpS	0.0010 µg/L
di-PFOS (5)	0.0010 µg/L
mono-PFOS (5)	0.0010 µg/L
L-PFOS (5)	0.0010 µg/L
Total PFOS (7)	0.0010 µg/L
Sum PFHxS+PFOS (1)	0.0010 µg/L
PFNS	0.0010 µg/L
PFDS	NR µg/L
PFECHS	0.0010 µg/L
Perfluoroalkylcarboxylic acids	
PFBA	0.0010 µg/L
PFPeA	0.0010 µg/L
PFHxA	0.0010 µg/L
PFHpA	0.0010 µg/L
PFOA	0.0010 µg/L
PFNA	0.0010 µg/L
PFDA	0.0010 µg/L
PFUnDA	0.0010 µg/L
PFDoDA	NR µg/L
PFTrDA	NR µg/L
PFTeDA	NR µg/L
P37DMOA	0.0010 µg/L
Perfluorooctanesulfonamides	
PFOSA	0.0010 µg/L
NEtFOSA-M	0.0010 µg/L
NMeFOSA-M	0.0010 µg/L
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	0.0010 µg/L
NMeFOSAA	0.0010 µg/L
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	0.0010 µg/L
NMeFOSE-M	0.0010 µg/L
Telomere Sulfonic acids	
4:2 FTS	0.0010 µg/L
6:2 FTS	0.0010 µg/L
8:2 FTS	0.0010 µg/L
10:2 FTS	NR µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.0010 µg/L

AsureQuality Reference: 25-200085

FPePA (5:3FTA)	0.0010 µg/L
FHpPA (7:3FTA)	0.0010 µg/L
Miscellaneous	
F-53B (major)	0.0010 µg/L
F-53B (minor)	NR µg/L
Sum F-53B	0.0010 µg/L
ADONA	0.0010 µg/L
HFPO-DA (GenX)	0.0010 µg/L

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water - AsureQuality Method (LC-MS/MS)**Analyte LOR**

Listing applies to samples: 25-200085-1

Perfluoroalkylsulfonic acids

PFPrS*	0.025 µg/L
PFBS*	0.025 µg/L
PFPeS*	0.025 µg/L
di-PFHxS (1)*	0.025 µg/L
mono-PFHxS (1)*	0.025 µg/L
L-PFHxS (1)*	0.025 µg/L
Total PFHxS (3)*	0.025 µg/L
PFHpS*	0.025 µg/L
di-PFOS (5)*	0.025 µg/L
mono-PFOS (5)*	0.025 µg/L
L-PFOS (5)*	0.025 µg/L
Total PFOS (7)*	0.025 µg/L
Sum PFHxS+PFOS (1)*	0.025 µg/L
PFNS*	0.050 µg/L
PFDS*	0.10 µg/L
PFECHS*	0.025 µg/L

Perfluoroalkylcarboxylic acids

PFBA*	0.10 µg/L
PFPeA*	0.10 µg/L
PFHxA*	0.025 µg/L
PFHpA*	0.025 µg/L
PFOA*	0.025 µg/L
PFNA*	0.025 µg/L
PFDA*	0.025 µg/L
PFUnDA*	0.025 µg/L
PFDoDA*	0.10 µg/L
PFTTrDA*	0.10 µg/L
PFTeDA*	0.10 µg/L
P37DMOA*	0.050 µg/L

Perfluorooctanesulfonamides

PFOSA*	0.025 µg/L
NEtFOSA-M*	0.10 µg/L
NMeFOSA-M*	0.10 µg/L

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA*	0.025 µg/L
NMeFOSAA*	0.025 µg/L

Perfluorooctanesulfonamidoethanols

NEtFOSE-M*	0.10 µg/L
NMeFOSE-M*	0.10 µg/L

Telomere Sulfonic acids

4:2 FTS*	0.025 µg/L
6:2 FTS*	0.050 µg/L
8:2 FTS*	0.10 µg/L
10:2 FTS*	0.025 µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)*	0.10 µg/L
FPePA (5:3FTA)*	0.025 µg/L
FHpPA (7:3FTA)*	0.025 µg/L
Miscellaneous	
F-53B (major)*	0.10 µg/L
F-53B (minor)*	0.050 µg/L
Sum F-53B*	0.1 µg/L
ADONA*	0.025 µg/L
HFPO-DA (GenX)*	0.050 µg/L

Analyte Definitions

Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water - AsureQuality Method (LC-MS/MS)

Analyte **Full Name**

Listing applies to samples: 25-200085-2, 25-200085-3

Perfluoroalkylsulfonic acids

PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid

Perfluoroalkylcarboxylic acids

PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid

Perfluorooctanesulfonamides

PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid

Perfluorooctanesulfonamidoethanols

Analyte	Full Name
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decane sulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecane sulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafuoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
Listing applies to samples: 25-200085-1	
Perfluoroalkylsulfonic acids	
PFPrS*	Perfluoro-1-propanesulfonic acid
PFBS*	Perfluoro-1-butanefulfonic acid
PFPeS*	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)*	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)*	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)*	Linear Perfluorohexanesulfonic acid
PFHpS*	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)*	Total Perfluorodimethylhexane sulfonic acids

Analyte	Full Name
mono-PFOS (5)*	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)*	Linear Perfluorooctanesulfonic acid
PFNS*	Perfluoro-1-nonanesulfonic acid
PFDS*	Perfluoro-1-decanesulfonic acid
PFECHS*	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA*	Perfluoro-n-butanoic acid
PFPeA*	Perfluoro-n-pentanoic acid
PFHxA*	Perfluoro-n-hexanoic acid
PFHpA*	Perfluoro-n-heptanoic acid
PFOA*	Perfluoro-n-octanoic acid
PFNA*	Perfluoro-n-nonanoic acid
PFDA*	Perfluoro-n-decanoic acid
PFUnDA*	Perfluoro-n-undecanoic acid
PFDoDA*	Perfluoro-n-dodecanoic acid
PFTTrDA*	Perfluoro-n-tridecanoic acid
PFTeDA*	Perfluoro-n-tetradecanoic acid
P37DMOA*	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA*	Perfluoro-1-octanesulfonamide
NEtFOSA-M*	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M*	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA*	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA*	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M*	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M*	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS*	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS*	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS*	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS*	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)*	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)*	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)*	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)*	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)*	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B*	Sum of F-53B components (major + minor)
ADONA*	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)*	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS*	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS*	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS*	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA*	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA*	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA*	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA*	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA*	Perfluoro-n-[13C8]octanoic acid
M9PFNA*	Perfluoro-n-[13C9]nonanoic acid
M6PFDA*	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA*	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid

Analyte	Full Name
MPFDoDA*	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA*	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA*	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA*	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA*	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA*	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA*	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE*	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE*	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS*	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA*	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

Any tests marked with * are not accredited for specific matrices or analytes.

LOR = Limit of Reporting

LOD = Limit of Detection

NR = Not Reportable

Certificate of Analysis

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Client:	Beca Limited	Lab No:	3940265	SPV9
Contact:	Tyler Neve C/- Beca Limited PO Box 3942 Wellington 6140	Date Received:	17-Jul-2025	
		Date Reported:	06-Oct-2025	
		Quote No:	96766	
		Order No:	3324338	
		Client Reference:	Miramar Golf Course	
		Submitted By:	Mio Akiyama	

Sample Type: Soil

	Sample Name:	MGC_TP13_0.0 17-Jul-2025	MGC_TP13_0.5 17-Jul-2025	MGC_TP13_1.0 17-Jul-2025	MGC_TP14_0.0 17-Jul-2025	MGC_TP14_0.4 17-Jul-2025
	Lab Number:	3940265.1	3940265.3	3940265.4	3940265.5	3940265.7
Individual Tests						
Dry Matter	g/100g as rcvd	-	90	87	-	88
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	-	5	-	-	4
Total Recoverable Cadmium	mg/kg dry wt	-	< 0.10	-	-	< 0.10
Total Recoverable Chromium	mg/kg dry wt	-	16	-	-	10
Total Recoverable Copper	mg/kg dry wt	-	10	-	-	5
Total Recoverable Lead	mg/kg dry wt	-	23	-	-	11.1
Total Recoverable Mercury	mg/kg dry wt	-	< 0.10	-	-	< 0.10
Total Recoverable Nickel	mg/kg dry wt	-	12	-	-	7
Total Recoverable Zinc	mg/kg dry wt	-	65	-	-	42
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	< 0.3	-	-	< 0.3
1-Methylnaphthalene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
2-Methylnaphthalene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Acenaphthylene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Acenaphthene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Anthracene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Benzo[a]anthracene	mg/kg dry wt	-	< 0.011	-	-	0.013
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	< 0.011	-	-	0.016
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	< 0.026	-	-	< 0.027
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	< 0.026	-	-	< 0.027
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	< 0.011	-	-	0.017
Benzo[e]pyrene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Benzo[g,h,i]perylene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Benzo[k]fluoranthene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Chrysene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Dibenzo[a,h]anthracene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Fluoranthene	mg/kg dry wt	-	< 0.011	-	-	0.024
Fluorene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Naphthalene	mg/kg dry wt	-	< 0.06	-	-	< 0.06
Perylene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Phenanthrene	mg/kg dry wt	-	< 0.011	-	-	< 0.011
Pyrene	mg/kg dry wt	-	< 0.011	-	-	0.027

Sample Type: Soil						
Sample Name:	MGC_TP14_0.6 17-Jul-2025	MGC_TP14_1.0 17-Jul-2025	MGC_TP15_0.0 17-Jul-2025	MGC_TP16_0.0 17-Jul-2025	MGC_TP16_0.3 17-Jul-2025	
Lab Number:	3940265.8	3940265.9	3940265.10	3940265.14	3940265.15	
Individual Tests						
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water**	-	-	-	See attached report	-	
Dry Matter g/100g as rcvd	89	89	85	-	-	
Heavy Metals with Mercury, 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	10	-	-	-	-	
Total Recoverable Copper mg/kg dry wt	5	-	-	-	-	
Total Recoverable Lead mg/kg dry wt	10.6	-	-	-	-	
Total Recoverable Mercury mg/kg dry wt	< 0.10	-	-	-	-	
Total Recoverable Nickel mg/kg dry wt	8	-	-	-	-	
Total Recoverable Zinc mg/kg dry wt	41	-	-	-	-	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil mg/kg dry wt	< 0.3	-	-	-	-	
1-Methylnaphthalene mg/kg dry wt	< 0.011	-	-	-	-	
2-Methylnaphthalene mg/kg dry wt	< 0.011	-	-	-	-	
Acenaphthylene mg/kg dry wt	< 0.011	-	-	-	-	
Acenaphthene mg/kg dry wt	< 0.011	-	-	-	-	
Anthracene mg/kg dry wt	< 0.011	-	-	-	-	
Benzo[a]anthracene mg/kg dry wt	0.015	-	-	-	-	
Benzo[a]pyrene (BAP) mg/kg dry wt	0.017	-	-	-	-	
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	< 0.027	-	-	-	-	
Benzo[a]pyrene Toxic Equivalence (TEF)*	< 0.027	-	-	-	-	
Benzo[b]fluoranthene + Benzo[j]fluoranthene mg/kg dry wt	0.018	-	-	-	-	
Benzo[e]pyrene mg/kg dry wt	< 0.011	-	-	-	-	
Benzo[g,h,i]perylene mg/kg dry wt	< 0.011	-	-	-	-	
Benzo[k]fluoranthene mg/kg dry wt	< 0.011	-	-	-	-	
Chrysene mg/kg dry wt	0.012	-	-	-	-	
Dibenzo[a,h]anthracene mg/kg dry wt	< 0.011	-	-	-	-	
Fluoranthene mg/kg dry wt	0.027	-	-	-	-	
Fluorene mg/kg dry wt	< 0.011	-	-	-	-	
Indeno(1,2,3-c,d)pyrene mg/kg dry wt	0.011	-	-	-	-	
Naphthalene mg/kg dry wt	< 0.06	-	-	-	-	
Perylene mg/kg dry wt	< 0.011	-	-	-	-	
Phenanthrene mg/kg dry wt	< 0.011	-	-	-	-	
Pyrene mg/kg dry wt	0.027	-	-	-	-	
Sample Name:	MGC_TP16_0.5 17-Jul-2025	MGC_TP16_1.0 17-Jul-2025	MGC_TP17_0.0 17-Jul-2025	MGC_TP17_0.3 17-Jul-2025	MGC_TP17_0.5 17-Jul-2025	
Lab Number:	3940265.16	3940265.17	3940265.18	3940265.19	3940265.20	
Individual Tests						
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water**	-	-	See attached report	-	-	
Dry Matter g/100g as rcvd	91	87	-	-	91	
Sample Name:	MGC_TP17_1.0 17-Jul-2025	MGC_TP18_0.0 17-Jul-2025	MGC_TP18_0.3 17-Jul-2025	MGC_TP18_0.5 17-Jul-2025	MGC_TP18_1.0 17-Jul-2025	
Lab Number:	3940265.21	3940265.22	3940265.23	3940265.24	3940265.25	
Individual Tests						
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water**	-	See attached report	-	-	-	
Dry Matter g/100g as rcvd	91	-	87	88	88	
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic mg/kg dry wt	-	-	4	-	4	
Total Recoverable Cadmium mg/kg dry wt	-	-	< 0.10	-	< 0.10	

Sample Type: Soil						
Sample Name:		MGC_TP17_1.0 17-Jul-2025	MGC_TP18_0.0 17-Jul-2025	MGC_TP18_0.3 17-Jul-2025	MGC_TP18_0.5 17-Jul-2025	MGC_TP18_1.0 17-Jul-2025
Lab Number:		3940265.21	3940265.22	3940265.23	3940265.24	3940265.25
Heavy Metals with Mercury, Screen Level						
Total Recoverable Chromium	mg/kg dry wt	-	-	13	-	14
Total Recoverable Copper	mg/kg dry wt	-	-	7	-	8
Total Recoverable Lead	mg/kg dry wt	-	-	16.2	-	17.0
Total Recoverable Mercury	mg/kg dry wt	-	-	< 0.10	-	< 0.10
Total Recoverable Nickel	mg/kg dry wt	-	-	9	-	10
Total Recoverable Zinc	mg/kg dry wt	-	-	45	-	52
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	< 0.3	-	< 0.3
1-Methylnaphthalene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
2-Methylnaphthalene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Acenaphthylene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Acenaphthene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Anthracene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Benzo[a]anthracene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	< 0.027	-	< 0.027
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	< 0.027	-	< 0.027
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Benzo[e]pyrene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Benzo[k]fluoranthene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Chrysene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Fluoranthene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Fluorene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Naphthalene	mg/kg dry wt	-	-	< 0.06	-	< 0.06
Perylene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Phenanthrene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Pyrene	mg/kg dry wt	-	-	< 0.011	-	< 0.012
Sample Name:		MGC_TP19_0.0 17-Jul-2025	MGC_TP20_0.0 17-Jul-2025	MGC_TP20_0.3 17-Jul-2025	MGC_TP20_1.0 17-Jul-2025	
Lab Number:		3940265.26	3940265.30	3940265.31	3940265.33	
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	88	81	
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	6	5	-	6	
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	-	< 0.10	
Total Recoverable Chromium	mg/kg dry wt	9	9	-	9	
Total Recoverable Copper	mg/kg dry wt	2	4	-	2	
Total Recoverable Lead	mg/kg dry wt	7.6	12.3	-	8.1	
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	-	< 0.10	
Total Recoverable Nickel	mg/kg dry wt	6	7	-	6	
Total Recoverable Zinc	mg/kg dry wt	27	36	-	27	
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	0.4	
1-Methylnaphthalene	mg/kg dry wt	-	-	-	0.013	
2-Methylnaphthalene	mg/kg dry wt	-	-	-	0.015	
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	-	-	-	0.025	

Sample Type: Soil					
Sample Name:		MGC_TP19_0.0 17-Jul-2025	MGC_TP20_0.0 17-Jul-2025	MGC_TP20_0.3 17-Jul-2025	MGC_TP20_1.0 17-Jul-2025
Lab Number:		3940265.26	3940265.30	3940265.31	3940265.33
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	0.032
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	0.050
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	0.049
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	-	-	-	0.040
Benzo[e]pyrene	mg/kg dry wt	-	-	-	0.021
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	0.023
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	0.016
Chrysene	mg/kg dry wt	-	-	-	0.027
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	< 0.013
Fluoranthene	mg/kg dry wt	-	-	-	0.056
Fluorene	mg/kg dry wt	-	-	-	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	0.026
Naphthalene	mg/kg dry wt	-	-	-	< 0.07
Perylene	mg/kg dry wt	-	-	-	< 0.013
Phenanthrene	mg/kg dry wt	-	-	-	0.039
Pyrene	mg/kg dry wt	-	-	-	0.055
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
Sample Type: Soil					
Sample Name:		MGC_TP13_0.0 17-Jul-2025	MGC_TP13_0.5 17-Jul-2025		
Lab Number:		3940265.1	3940265.3		
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0036	-	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0037	-	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	-	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	-	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	-	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	-	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	-	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	-	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	-	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	-	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	-	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0033	-	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	-	

Sample Type: Soil					
			Sample Name:	MGC_TP13_0.0 17-Jul-2025	MGC_TP13_0.5 17-Jul-2025
			Lab Number:	3940265.1	3940265.3
PFAS in Soil - Perfluorosulfonic Acids					
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0036	-	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	-	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	-	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	-	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	-	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	-	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	-	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	-	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	-	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	-	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	-	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	-	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	-	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	-	
			Sample Name:	MGC_TP13_1.0 17-Jul-2025	MGC_TP14_0.0 17-Jul-2025
			Lab Number:	3940265.4	3940265.5
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0013	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0029	0.0014	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP13_1.0 17-Jul-2025	MGC_TP14_0.0 17-Jul-2025
			Lab Number:	3940265.4	3940265.5
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	0.0026	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	0.0029	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0012	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0013	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP14_1.0 17-Jul-2025	MGC_TP15_0.0 17-Jul-2025
			Lab Number:	3940265.9	3940265.10
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.20	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.20	< 0.0010	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	0.21	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP14_1.0 17-Jul-2025	MGC_TP15_0.0 17-Jul-2025
			Lab Number:	3940265.9	3940265.10
PFAS in Soil - Perfluorocarboxylic Acids					
PfUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PfDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PfTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PfTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPs	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBs	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	0.0014	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PfHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	0.0015	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.123	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	0.080	< 0.0010	
PfOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.20	< 0.0010	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafuoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PfMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PfMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP16_0.0 17-Jul-2025	MGC_TP16_0.3 17-Jul-2025
			Lab Number:	3940265.14	3940265.15
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PfOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0174	0.0082	
PfHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0176	0.0095	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	

Sample Type: Soil					
			Sample Name:	MGC_TP16_0.0 17-Jul-2025	MGC_TP16_0.3 17-Jul-2025
			Lab Number:	3940265.14	3940265.15
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	0.0012	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0012	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0155	0.0040	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	0.0019	0.0043	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0174	0.0082	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP16_0.5 17-Jul-2025	MGC_TP16_1.0 17-Jul-2025
			Lab Number:	3940265.16	3940265.17
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0012	0.0011	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil				
		Sample Name:	MGC_TP16_0.5 17-Jul-2025	MGC_TP16_1.0 17-Jul-2025
		Lab Number:	3940265.16	3940265.17
PFAS in Soil - Miscellaneous				
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
		Sample Name:	MGC_TP17_0.0 17-Jul-2025	MGC_TP17_0.3 17-Jul-2025
		Lab Number:	3940265.18	3940265.19
PFAS in Soil - Summary				
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0157	0.0049
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0160	0.0052
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046
PFAS in Soil - Perfluorocarboxylic Acids				
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPoS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBs	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0126	0.0045
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	0.0031	< 0.0010
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0157	0.0049
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

Sample Type: Soil					
			Sample Name:	MGC_TP17_0.0 17-Jul-2025	MGC_TP17_0.3 17-Jul-2025
			Lab Number:	3940265.18	3940265.19
PFAS in Soil - Miscellaneous					
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP17_0.5 17-Jul-2025	MGC_TP17_1.0 17-Jul-2025
			Lab Number:	3940265.20	3940265.21
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.085	0.0041	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.085	0.0060	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	0.085	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPpS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	0.0018	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0019	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.068	0.0033	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	0.017	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.085	0.0041	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP17_0.5 17-Jul-2025	MGC_TP17_1.0 17-Jul-2025
			Lab Number:	3940265.20	3940265.21
PFAS in Soil - Miscellaneous					
11CI-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9CI-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP18_0.0 17-Jul-2025	MGC_TP18_0.3 17-Jul-2025
			Lab Number:	3940265.22	3940265.23
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0068	0.0070	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0069	0.0072	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPs	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	0.0065	0.0056	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	0.0014	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0068	0.0070	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP18_0.0 17-Jul-2025	MGC_TP18_0.3 17-Jul-2025
			Lab Number:	3940265.22	3940265.23
PFAS in Soil - Fluorotelomer Sulfonic Acids					
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP18_0.5 17-Jul-2025	MGC_TP18_1.0 17-Jul-2025
			Lab Number:	3940265.24	3940265.25
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0013	0.0065	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	0.0016	0.0072	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPpS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0047	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	0.0018	

Sample Type: Soil					
			Sample Name:	MGC_TP18_0.5 17-Jul-2025	MGC_TP18_1.0 17-Jul-2025
			Lab Number:	3940265.24	3940265.25
PFAS in Soil - Perfluorosulfonic Acids					
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	0.0013	0.0065	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP19_0.0 17-Jul-2025	MGC_TP20_0.0 17-Jul-2025
			Lab Number:	3940265.26	3940265.30
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0013	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	0.0013	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil					
			Sample Name:	MGC_TP19_0.0 17-Jul-2025	MGC_TP20_0.0 17-Jul-2025
			Lab Number:	3940265.26	3940265.30
PFAS in Soil - Perfluorosulfonic Acids					
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0012	
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0013	
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Sulfonic Acids					
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Fluorotelomer Carboxylic Acid					
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFAS in Soil - Miscellaneous					
11Cl-PF3OUdS	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010	
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010	
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010	
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010	
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010	
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
			Sample Name:	MGC_TP20_0.3 17-Jul-2025	MGC_TP20_1.0 17-Jul-2025
			Lab Number:	3940265.31	3940265.33
PFAS in Soil - Summary					
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0014	
PFHxS+PFOS	The numerical sum of Total PFHxS and Total PFOS	mg/kg dry wt	< 0.0010	0.0018	
Total PFAS	Total of Reported PFAS in Soil	mg/kg dry wt	< 0.046	< 0.046	
PFAS in Soil - Perfluorocarboxylic Acids					
PFBA	Perfluorobutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFPeA	Perfluoropentanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHxA	Perfluorohexanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFHpA	Perfluoroheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFOA	Perfluorooctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFNA	Perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	
PFDA	Perfluorodecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010	

Sample Type: Soil

		Sample Name:	MGC_TP20_0.3 17-Jul-2025	MGC_TP20_1.0 17-Jul-2025
		Lab Number:	3940265.31	3940265.33
PFAS in Soil - Perfluorocarboxylic Acids				
PfUnDA	Perfluoroundecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PfDoDA	Perfluorododecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PfTrDA	Perfluorotridecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PfTeDA	Perfluorotetradecanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Perfluorosulfonic Acids				
L-PFPrS	Perfluoropropanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFBS	Perfluorobutanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFPeS	Perfluoropentanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHxS	Perfluorohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
B-PFHxS	Perfluorohexanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PfHxS	Perfluorohexanesulfonic acid - Total	mg/kg dry wt	< 0.0010	< 0.0010
L-PFHpS	Perfluoroheptanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFOS	Perfluorooctanesulfonic acid	mg/kg dry wt	< 0.0010	0.0010
B-PFOS	Perfluorooctanesulfonic acid - Branched	mg/kg dry wt	< 0.0010	< 0.0010
PfOS	Perfluorooctanesulfonic acid - Total	mg/kg dry wt	< 0.0010	0.0014
L-PFNS	Perfluorononanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDS	Perfluorodecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
L-PFDoS	Perfluorododecanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Sulfonic Acids				
4:2 FTS	4:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
6:2 FTS	6:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
8:2 FTS	8:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
10:2 FTS	10:2 Fluorotelomersulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Fluorotelomer Carboxylic Acid				
3:3 FTCA	3:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
5:3 FTCA	5:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
7:3 FTCA	7:3 Fluorotelomercarboxylic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFAS in Soil - Miscellaneous				
11Cl-PF3OUdS	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
9Cl-PF3ONS	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
ADONA	4,8-Dioxa-3H-perfluorononanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
HFPO-DA	Hexafluoropropylene oxide dimer acid	mg/kg dry wt	< 0.0010	< 0.0010
NFDHA	Nonafluoro-3,6-dioxaheptanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFEESA	Perfluoro(2-ethoxyethane)sulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMPA	Perfluoro-3-methoxypropanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
PFMBA	Perfluoro-4-methoxybutanoic acid	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	mg/kg dry wt	< 0.0010	< 0.0010
FOSA	Perfluorooctanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSA	N-methylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSA	N-ethylperfluoro-1-octanesulfonamide	mg/kg dry wt	< 0.0010	< 0.0010
NMeFOSE	2-[N-methylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
NEtFOSE	2-[N-ethylperfluoro-1-octanesulfonamido]-ethanol	mg/kg dry wt	< 0.0010	< 0.0010
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid	mg/kg dry wt	< 0.0010	< 0.0010
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid	mg/kg dry wt	< 0.0010	< 0.0010

Analyst's Comments

‡ Analysis subcontracted to an external provider. Refer to the Summary of Methods section for more details.

Appendix No.1 - AsureQuality Report

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).	-	3, 7-8, 23, 25-26, 30, 33
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	3, 7-8, 23, 25, 33
Poly- and Perfluorinated Alkyl Substances in TCLP Reagent Water*	Analysis by LC-MS/MS. Subcontracted toASUREQuality, Lower Hutt.	-	14, 18, 22
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	3-4, 7-10, 16-17, 20-21, 23-25, 31, 33
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).	0.10 g/100g as rcvd	1, 5, 14-15, 18-19, 22-23, 26, 30
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	3, 7-8, 23, 25, 33
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	3, 7-8, 23, 25, 33
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	33
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. US EPA 200.2 (modified), APHA 3125 B: Online Edition.	0.10 - 4 mg/kg dry wt	3, 7-8, 23, 25-26, 30, 33
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	3, 7-8, 23, 25
PFAS in Soil	Solvent extraction. LC-MS/MS analysis. Tested on as received sample. In-house based on ASTM D7968.	0.0010 - 0.046 mg/kg dry wt	1, 4-5, 9-10, 14-26, 30-31, 33
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	33
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	33
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	33
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	33

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

Testing was completed between 19-Jul-2025 and 06-Oct-2025. For completion dates of individual analyses please contact the laboratory.

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

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



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

Certificate of Analysis

Submission Reference: **EnvSubAQ_LH 1413**

Final Report

Pre-registration ID: zxh-CkH-QGG

PO Number: XXXXXXXXXX

Hill Subcontracting
Hill Laboratories - Hamilton
Private Bag 3205
Hamilton 3240
New Zealand

Report Issued: 07-Aug-2025

AsureQuality Reference: **25-200139**

Sample(s) Received: 24-Jul-2025 08:45

Testing Period: 24-Jul-2025 to 01-Aug-2025

Date of analysis is available on request.

Results

The tests were performed on the samples as received.

Customer Sample Name: MGC_TP16_0.0 Lab ID: 25-200139-1

Sample Description: 3940265.14

Sample Condition: Acceptable

Sampled Date: 17-Jul-2025

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	0.051	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.36	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.41	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.41	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Ltd has used reasonable skill, care, and effort to provide an accurate analysis of the sample(s) which form(s) the subject of this report. However, the accuracy of this analysis is reliant on, and subject to, the sample(s) provided by you and your responsibility as to transportation of the sample(s). AsureQuality Ltd's standard terms of business apply to the analysis set out in this report: <https://www.asurequality.com/about/terms-of-business/>

Report Number: **4345909**

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Test	Result	Unit	Method Reference
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	101	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	97	%	AsureQuality Method (LC-MS/MS)
M8PFOS	99	%	AsureQuality Method (LC-MS/MS)
M4PFBA	101	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	103	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	101	%	AsureQuality Method (LC-MS/MS)
MPFHpA	108	%	AsureQuality Method (LC-MS/MS)
M8PFOA	105	%	AsureQuality Method (LC-MS/MS)
M9PFNA	94	%	AsureQuality Method (LC-MS/MS)
M6PFDA	104	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	94	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	99	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	94	%	AsureQuality Method (LC-MS/MS)
MPFOSA	98	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	98	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	105	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-200139

Report Issued: 07-Aug-2025

Test	Result	Unit	Method Reference
DNMeFOSE	96	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	106	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	86	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	105	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: MGC_TP17_0.0

Lab ID: 25-200139-2

Sample Description: 3940265.18

Sample Condition: Acceptable

Sampled Date: 17-Jul-2025

Test	Result	Unit	Method Reference
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Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water**Perfluoroalkylsulfonic acids**

PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	0.13	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.61	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.74	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.74	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Perfluoroalkylcarboxylic acids

PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamides

PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamidoacetic acids

NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

Perfluorooctanesulfonamidoethanols

NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
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AsureQuality Reference: 25-200139

Report Issued: 07-Aug-2025

Test	Result	Unit	Method Reference
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	101	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	98	%	AsureQuality Method (LC-MS/MS)
M8PFOS	99	%	AsureQuality Method (LC-MS/MS)
M4PFBA	101	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	101	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	105	%	AsureQuality Method (LC-MS/MS)
MPFHpA	110	%	AsureQuality Method (LC-MS/MS)
M8PFOA	103	%	AsureQuality Method (LC-MS/MS)
M9PFNA	94	%	AsureQuality Method (LC-MS/MS)
M6PFDA	105	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	95	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	101	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	100	%	AsureQuality Method (LC-MS/MS)
MPFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	97	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	97	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	112	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	85	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	86	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: MGC_TP18_0.0

Lab ID: 25-200139-3

Sample Description: 3940265.22

Sample Condition: Acceptable

Sampled Date: 17-Jul-2025

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPoS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.27	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.27	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.27	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-200139

Report Issued: 07-Aug-2025

Test	Result	Unit	Method Reference
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	99	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	95	%	AsureQuality Method (LC-MS/MS)
M8PFOS	98	%	AsureQuality Method (LC-MS/MS)
M4PFBA	104	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	103	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	106	%	AsureQuality Method (LC-MS/MS)
M8PFOA	99	%	AsureQuality Method (LC-MS/MS)
M9PFNA	90	%	AsureQuality Method (LC-MS/MS)
M6PFDA	98	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	85	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	97	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	85	%	AsureQuality Method (LC-MS/MS)
MPFOA	95	%	AsureQuality Method (LC-MS/MS)
DNEtFOA	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOA	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	96	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	101	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	98	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	97	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	113	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	77	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	108	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Duplicate of 25-200139-3A

Lab ID: 25-200139-4

Sample Description: 27834726_Duplicate

Sample Condition: Acceptable

Sampled Date: 17-Jul-2025

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	0.24	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	0.24	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	0.24	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDODA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	98	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	97	%	AsureQuality Method (LC-MS/MS)
M8PFOS	100	%	AsureQuality Method (LC-MS/MS)
M4PFBA	103	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	101	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	104	%	AsureQuality Method (LC-MS/MS)
MPFFHpA	108	%	AsureQuality Method (LC-MS/MS)
M8PFOA	100	%	AsureQuality Method (LC-MS/MS)
M9PFNA	88	%	AsureQuality Method (LC-MS/MS)
M6PFDA	100	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	86	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
MPFDoDA	96	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	94	%	AsureQuality Method (LC-MS/MS)
MPFOA	96	%	AsureQuality Method (LC-MS/MS)
DNEtFOA	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOA	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOAA	93	%	AsureQuality Method (LC-MS/MS)
DNMeFOAA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	98	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	119	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	82	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	111	%	AsureQuality Method (LC-MS/MS)

QC Results

Blank

Relates to sample(s) 25-200139-1, 25-200139-2, 25-200139-3, 25-200139-4

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPpPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	101	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	99	%	AsureQuality Method (LC-MS/MS)
M8PFOS	100	%	AsureQuality Method (LC-MS/MS)
M4PFBA	100	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	99	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	102	%	AsureQuality Method (LC-MS/MS)
MPFHpA	108	%	AsureQuality Method (LC-MS/MS)
M8PFOA	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA	105	%	AsureQuality Method (LC-MS/MS)
M6PFDA	103	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	107	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	103	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	101	%	AsureQuality Method (LC-MS/MS)
MPFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	103	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 25-200139

Report Issued: 07-Aug-2025

Test	Result	Unit	Method Reference
DNMeFOSE	101	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	98	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	103	%	AsureQuality Method (LC-MS/MS)

Analysis Summary

Wellington Laboratory

Analysis	Method	Authorised by
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water DX-PFCS02, 06-TCLP_W	AsureQuality Method (LC-MS/MS)	Christopher Sampson

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery.

In house protocol based on US EPA 1311 test Toxicity Characteristic Leaching Procedure (TCLP).

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.



Christopher Sampson
Scientist

Appendix

Analyte LOR Summary

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water - AsureQuality Method (LC-MS/MS)

Analyte	LOR
Perfluoroalkylsulfonic acids	
PFPPrS	0.025 µg/L
PFBS	0.025 µg/L
PFPeS	0.025 µg/L
di-PFHxS (1)	0.025 µg/L
mono-PFHxS (1)	0.025 µg/L
L-PFHxS (1)	0.025 µg/L
Total PFHxS (3)	0.025 µg/L
PFHpS	0.025 µg/L
di-PFOS (5)	0.025 µg/L
mono-PFOS (5)	0.025 µg/L
L-PFOS (5)	0.025 µg/L
Total PFOS (7)	0.025 µg/L
Sum PFHxS+PFOS (1)	0.025 µg/L
PFNS	0.050 µg/L
PFDS	0.10 µg/L
PFECHS	0.025 µg/L
Perfluoroalkylcarboxylic acids	
PFBA	0.10 µg/L
PFPeA	0.10 µg/L
PFHxA	0.025 µg/L
PFHpA	0.025 µg/L
PFOA	0.025 µg/L
PFNA	0.025 µg/L
PFDA	0.025 µg/L
PFUnDA	0.025 µg/L
PFDoDA	0.10 µg/L
PFTTrDA	0.10 µg/L
PFTeDA	0.10 µg/L
P37DMOA	0.050 µg/L
Perfluorooctanesulfonamides	
PFOSA	0.025 µg/L
NEtFOSA-M	0.10 µg/L
NMeFOSA-M	0.10 µg/L
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	0.025 µg/L
NMeFOSAA	0.025 µg/L
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	0.10 µg/L
NMeFOSE-M	0.10 µg/L
Telomere Sulfonic acids	
4:2 FTS	0.025 µg/L
6:2 FTS	0.050 µg/L
8:2 FTS	0.10 µg/L
10:2 FTS	0.025 µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.10 µg/L
FPePA (5:3FTA)	0.025 µg/L

AsureQuality Reference: 25-200139

FHpPA (7:3FTA)	0.025 µg/L
Miscellaneous	
F-53B (major)	0.10 µg/L
F-53B (minor)	0.050 µg/L
Sum F-53B	0.1 µg/L
ADONA	0.025 µg/L
HFPO-DA (GenX)	0.050 µg/L

Analyte Definitions**Poly and Perfluorinated Alkyl Substances (PFAS) in Soil Leachate - Reagent Water - AsureQuality Method (LC-MS/MS)**

Analyte	Full Name
Perfluoroalkylsulfonic acids	
PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid

Analyte	Full Name
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

LOR = Limit of Reporting

LOD = Limit of Detection

NR = Not Reportable

Certificate of Analysis

Page 1 of 1

Client: Beca Limited	Lab No: 3945293	SPV1
Contact: Tyler Neve	Date Received: 24-Jul-2025	
C/- Beca Limited	Date Reported: 08-Aug-2025	
PO Box 3942	Quote No: 96766	
Wellington 6140	Order No: 3324338/09.09B	
	Client Reference: MGC Ridge	
	Submitted By: Genevieve Jessica Smith	

Sample Type: Soil						
Sample Name:	MGC_HA40_0.0 24-Jul-2025	MGC_HA41_0.0 24-Jul-2025	MGC_HA42_0.0 24-Jul-2025	MGC_HA43_0.0 24-Jul-2025	MGC_HA44_0.0 24-Jul-2025	
Lab Number:	3945293.1	3945293.3	3945293.5	3945293.7	3945293.9	
Heavy Metals with Mercury, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	4	< 4	4	8
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	0.3	< 0.10	0.13
Total Recoverable Chromium	mg/kg dry wt	8	10	10	6	10
Total Recoverable Copper	mg/kg dry wt	3	5	14	5	12
Total Recoverable Lead	mg/kg dry wt	5.6	12.2	24	5.6	21
Total Recoverable Mercury	mg/kg dry wt	< 0.10	< 0.10	< 0.2	< 0.10	< 0.10
Total Recoverable Nickel	mg/kg dry wt	6	8	8	5	9
Total Recoverable Zinc	mg/kg dry wt	29	53	90	34	60

Summary of Methods

The following table(s) give 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.

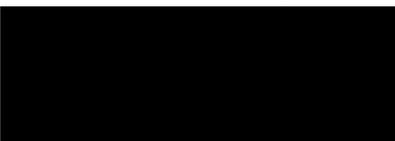
Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1, 3, 5, 7, 9
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required. US EPA 200.2 (modified), APHA 3125 B: Online Edition.	0.10 - 4 mg/kg dry wt	1, 3, 5, 7, 9

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

Testing was completed between 06-Aug-2025 and 08-Aug-2025. For completion dates of individual analyses please contact the laboratory.

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

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



Ara Heron BSc (Tech)
Client Services Manager - Environmental



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.

G

Appendix G – Test Pit Logs



Environmental Test Pit Log

Test Pit ID: MGC_TP09
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422519.2
		Easting:	1751627.9
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
			0.5	-0.5		Soft, 'Loose', fine to coarse orange-brown SAND with fine angular gravels; moist: grey mottles.	Fill
			1.0	-1.0		Loose, dark brown fine to coarse SAND, moist.	Marginal Marine Deposits
			1.5	-1.5		1.00m - End of test pit, Reached target depth	

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	Mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MCG_TP10
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422516.3
		Easting:	1751653.0
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Brown SAND, some rootlets, moist.	
						Orange-brown fine to coarse SAND with fine angular gravels. Dry, loose, soft.	Fill
			0.5	-0.5		Orange-brown fine to coarse SAND with medium angular gravels. Dry, soft, loose.	Marginal Marine Deposits
			1.0	-1.0		1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:		Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

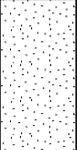
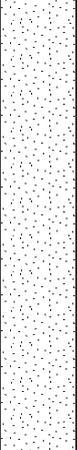
Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP11
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422544.4
		Easting:	1751645.6
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Soft, 'Loose', fine to coarse orange-brown SAND with fine angular gravels; moist: grey mottles.	Fill
						Dark brown fine to coarse SAND. Dry, loose, soft.	
			0.5	-0.5		Brown fine to coarse SAND with some medium gravels. Dry, loose.	Marginal Marine Deposits
			1.0	-1.0	1.00m - End of test pit, Reached target depth		
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP12
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422538.1
		Easting:	1751663.5
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Light brown fine to coarse SAND. Some rootlets, dry, loose.	Fill
			0.5	-0.5		Dark brown fine to coarse SAND. Soft, loose, dry.	Marginal Marine Deposits
			1.0	-1.0		1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP13
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422557.4
		Easting:	1751659.6
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Light brown fine to coarse SAND. Some rootlets, dry, loose, soft.	Fill
						Dark brown fine to coarse SAND. Dry, loose, soft.	
			0.5	-0.5		Orange-brown fine to coarse SAND with some medium angular gravels. Dry, loose.	Marginal Marine Deposits
			1.0	-1.0		1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP14
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422555.5
		Easting:	1751679.8
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Light brown fine to coarse SAND. Some rootlets, dry, loose. [Organic odour, pieces of clay pipe encountered]	
			0.5	-0.5		Green-grey fine to coarse SAND with green mottles and trace fine angular gravels.	Fill
			1.0	-1.0		Light brown fine to coarse SAND. Dry, loose, soft.	Marginal Marine Deposits
						1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP15
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422548.9
		Easting:	1751695.3
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
			0.5	-0.5		Dark brown fine to coarse SAND. Dry, loose, soft.	Marginal Marine Deposits
			1.0	-1.0		1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP16
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422570.5
		Easting:	1751673.2
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Light brown fine to medium SAND with some fine to medium angular gravels. Dry, loose.	Fill
			0.5	-0.5		Light brown fine to coarse SAND with minor fine to medium gravels and <5% brown-orange mottles. Dry, loose.	
						Dark brown fine to coarse SAND. Dry, loose, soft.	Marginal Marine Deposits
			1.0	-1.0	1.00m - End of test pit, Reached target depth		
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP17
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422571.5
		Easting:	1751687.4
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Dark brown fine to medium SAND, with some medium gravels. Dry, loose.	Fill
						Same as above, but trace (5%) orange mottles.	
			0.5	-0.5		Brown fine to coarse SAND. Dry, loose, soft.	Marginal Marine Deposits
			1.0	-1.0		1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP18
Sheet 1 of 1

Project: WIAL Sea Defences Renewal	Project Number: 3324338
Site Location: Wellington International Airport Seawall, Moa Point Road	Client: Wellington International Airport Limited
Location: Miramar Golf Course	Coordinate System: NZTM2000
	Vertical Datum: N/A
	Northing: 5422587.5
	Ground Level (mRL): N/A
	Easting: 1751662.7
	Location Method: GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Grey-brown fine to coarse SAND with minor fine angular gravels. Dry, loose.	Fill
			0.5	-0.5		Grey-brown fine to coarse SAND with fine to medium angular gravels and <5% orange mottles.	
						Brown fine to coarse SAND with fine to coarse angular gravels. Trace (<5%) orange mottles, dry, loose.	
			1.0	-1.0		1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started: 16/07/25	Logged By: MA	Comments: Groundwater not encountered
Method: TP	Contractor: McConnell Dowell	
Face Orientation: N/A	Equipment: 1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.



Environmental Test Pit Log

Test Pit ID: MGC_TP20
Sheet 1 of 1

Project:	WIAL Sea Defences Renewal	Project Number:	3324338
Site Location:	Wellington Internation Airport Seawall, Moa Point Road	Client:	Wellington International Airport Limited
Location:	Miramar Golf Course	Coordinate System:	NZTM2000
		Northing:	5422674.1
		Easting:	1751689.6
		Vertical Datum:	N/A
		Ground Level (mRL):	N/A
		Location Method:	GPS/Phone

Groundwater (m)	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
						Brown fine to coarse SAND. Some rootlets, dry, loose, soft.	
			0.5	-0.5		Dark brown fine to coarse SAND, with minor fine to medium angular gravels and minor orange mottles. Dry.	Fill
			1.0	-1.0		Dark brown fine to coarse SAND. Dry, loose, soft.	Marginal Marine Deposits
						1.00m - End of test pit, Reached target depth	
			1.5	-1.5			

Date Started:	16/07/25	Logged By:	MA	Comments: Groundwater not encountered
Method:	TP	Contractor:	McConnell Dowell	
Face Orientation:	N/A	Equipment:	1.5 t mini excavator	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.

H

Appendix H – Site Photography

Site Location:
Miramar Golf Course, 28 Stewart Duff Drive,
Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.	Date
1	7/05/25

Description:
Artificial pond onsite
with residential suburb
Strathmore Park in the
background. Facing east.



Photo No.	Date
2	7/05/25

Description:
MGC facing south, with
the Sludge Minimisation
Facility being
constructed in the
background



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.	Date
3	7/05/25

Description:
Golf course green, with grass removed. Facing south.



Photo No.	Date
4 & 5	7/05/25

Description:
HA01 – example of soils encountered at the site.



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
6

Date
7/05/25

Description:
HA03, on golf course green



Photo No.
7

Date
7/05/25

Description:
HA06, on fairway. Example of soils encountered on fairway.



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
8

Date
16/07/25

Description:
Facing south across golf course.



Photo No.
9 & 10

Date
16/07/25

Description:
TP09, 0.1 m bgl, and close-up of soils at 0.1 m.



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
11 & 12

Date
16/07/25

Description:
TP09, dark brown sand observed 0.6 m bgl (left) and soil excavated from TP09 (right).



Photo No.
13 & 14

Date
16/07/25

Description:
MGC_TP10



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
15 & 16

Date
16/07/25

Description:
MGC_TP11



Photo No.
17 & 18

Date
16/07/25

Description:
MGC_TP12



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
19 & 20

Date
16/07/25

Description:
MGC_TP14



Photo No.
21 & 22

Date
16/07/25

Description:
MGC_TP14, grey-green mottling (left) and terracotta pipe fragment (right).



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
23 & 24

Date
16/07/25

Description:
MGC_TP15



Photo No.
25 & 26

Date
16/07/25

Description:
MGC_TP16



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
27 & 28

Date
16/07/25

Description:
MGC_TP16



Photo No.
29 & 30

Date
16/07/25

Description:
MGC_TP17



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
31 & 32

Date
16/07/25

Description:
MGC_TP18



Photo No.
33

Date
24/07/25

Description:
Shed exterior – gib board on upper external wall.



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
34

Date
24/07/25

Description:
Shed exterior.



Photo No.
35

Date
24/07/25

Description:
Shed exterior.



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
36 & 37

Date
24/07/25

Description:
MGC_HA42, on the ridge



Photo No.
38 & 39

Date
24/07/25

Description:
MGC_HA43, on the ridge



Site Location:
Miramar Golf Course, 28 Stewart Duff Drive, Wellington

Project:
WIAL Sea Defences Renewal Project

Photo No.
40

Date
24/07/25

Description:
MGC_HA41, on the ridge



Photo No.
48

Date
24/07/25

Description:
MGC_HA44, on the ridge





Appendix I – Results Assessment Tables



Heavy Metals								
	Aspenic	Cadmium	Chromium (III-VI)	Copper	Lead	Mercury	Nickel	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NECS Commercial/Industrial outdoor worker (unpaved) ¹	70	1,300	6,300	10,000	3,300	4,200	-	-
Australian NEMP Measure 1999 (updated 2013) - Commercial/Industrial ²	-	-	-	-	-	-	6,000	400,000
PFAS NEMP 2025 HIL D Industrial/commercial ³	-	-	-	-	-	-	-	-
Eco SGVs Investigation Trigger (80%) Values ⁴	60	12	400	190	900	-	-	285
Canadian Environmental Quality Guidelines (CCME) - Industrial ⁵	-	-	-	-	-	50	89	-
PFAS NEMP 2025 Eco-SGVs - Direct Exposure ⁶	-	-	-	-	-	-	-	-
PFAS NEMP 2025 Eco-SGVs - Indirect Exposure ⁶	-	-	-	-	-	-	-	-
MfE Hazardous Waste Guidelines Class A Screening ⁷	100	20	100	100	100	4	200	200
Wellington Region Background (Greywacke) ⁸	7	0.1	16	25	78.6	0.2	13	105

Sample Code	Field ID	Date	Depth (m bgl)	4	8	8	6	6	6	34
3882108_32	Composite 1 (Composite of MGC_HA01_0.0 & MGC_HA02_0.1_T)	08/05/2025	Surface	4	10.10	8	3	4.9	10.10	6
3882108_33	Composite 2 (Composite of MGC_HA01_0.3 & MGC_HA02_0.3_T)	08/05/2025	0.3	5	10.10	8	3	4.9	10.10	6
3882108_34	Composite 3 (Composite of MGC_HA03_0.1_G, MGC_HA04_0.1_G & MGC_HA05_0.1_G)	08/05/2025	Surface	4	10.10	7	5	4.9	10.10	6
3882108_35	Composite 4 (Composite of MGC_HA03_0.3_G, MGC_HA04_0.3_G & MGC_HA05_0.3_G)	08/05/2025	0.3	6	10.10	8	3	3.8	10.10	6
3882108_36	Composite 5 (Composite of MGC_HA06_0.1_F, MGC_HA07_0.1_F, MGC_HA08_0.1_F & MGC_HA09_0.1_F)	08/05/2025	Surface	5	10.10	12	6	12.1	10.10	8
3882108_37	Composite 6 (Composite of MGC_HA06_0.3_F, MGC_HA07_0.3_F, MGC_HA09_0.3_F & MGC_HA10_0.3_F)	08/05/2025	0.3	5	10.10	12	5	11.2	10.10	8
3882108_38	Composite 7 (Composite of MGC_HA14_0.1_F, MGC_HA15_0.1_F, MGC_HA16_0.1_F & MGC_HA17_0.1_F)	08/05/2025	Surface	6	10.10	9	3	6.7	10.10	7
3882108_39	Composite 8 (Composite of MGC_HA14_0.3_F, MGC_HA15_0.3_F, MGC_HA16_0.3_F & MGC_HA17_0.3_F)	08/05/2025	0.3	5	10.10	9	4	7	10.10	7
3883331_52	Composite 13 (Composite of MGC_HA18_0.1_G, MGC_HA19_0.1_G, MGC_HA20_0.1_G & MGC_HA21_0.1_G)	09/05/2025	Surface	4	10.10	7	5	4.1	10.10	6
3883331_53	Composite 14 (MGC_HA18_0.3_G, MGC_HA19_0.3_G, MGC_HA20_0.3_G & MGC_HA21_0.3_G)	09/05/2025	0.3	5	10.10	8	2	3.8	10.10	6
3883331_54	Composite 15 (Composite of MGC_HA22_0.1_F, MGC_HA23_0.1_F, MGC_HA24_0.1_F & MGC_HA25_0.1_F)	09/05/2025	Surface	5	10.10	10	4	8.4	10.10	7
3883331_55	Composite 16 (Composite of MGC_HA22_0.3_F, MGC_HA23_0.3_F, MGC_HA24_0.3_F & MGC_HA25_0.3_F)	09/05/2025	0.3	5	10.10	8	3	6.9	10.10	7
3883331_56	Composite 17 (Composite of MGC_HA31_0.1_T & MGC_HA32_0.1_T)	09/05/2025	Surface	6	10.10	9	3	7	10.10	6
3883331_57	Composite 18 (MGC_HA31_0.3_T & MGC_HA32_0.3_T)	09/05/2025	0.3	6	10.10	9	3	6.9	0.11	7
3883331_58	Composite 19 (MGC_HA36_0.1_T & MGC_HA37_0.1_T)	09/05/2025	Surface	4	10.10	8	5	4.7	10.10	6
3883331_59	Composite 20 (Composite of MGC_HA36_0.3_T & MGC_HA37_0.3_T)	09/05/2025	0.3	4	10.10	8	4	4.6	10.10	6
3882108_18	MGC_HA10_0.1_O	07/05/2025	Surface	5	10.10	9	4	5.7	10.10	7
3882108_19	MGC_HA10_0.3_O	07/05/2025	0.3	5	10.10	8	2	4.3	10.10	6
3882108_24	MGC_HA13_0.1_O	07/05/2025	Surface	5	10.10	8	3	6.5	10.10	7
3882108_25	MGC_HA13_0.3_O	07/05/2025	0.3	5	10.10	8	3	6.1	10.10	7
3883331_23	MGC_HA27_0.1_O	08/05/2025	Surface	5	10.10	9	2	6.3	10.10	6
3883331_24	MGC_HA27_0.3_O	08/05/2025	0.3	5	10.10	8	1	3.9	10.10	6
3883331_25	MGC_HA28_0.1_O	08/05/2025	Surface	4	10.10	8	3	6.6	10.10	6
3883331_26	MGC_HA28_0.3_O	08/05/2025	0.3	5	10.10	9	4	6.8	10.10	7
3883331_30	MGC_HA30_0.1_O	08/05/2025	Surface	6	10.10	10	4	8.7	10.10	7
3883331_31	MGC_HA30_0.3_O	08/05/2025	0.3	6	10.10	9	1	3.8	10.10	6
3939403_35	MGC_TP09_0.5	16/07/2025	0.5	3	10.10	18	7	16.1	10.10	8
3939403_42	MGC_TP11_0.3	16/07/2025	0.3	5	10.10	14	7	14	10.10	9
3939403_43	MGC_TP11_0.5	16/07/2025	0.5	4	10.10	13	13	25	10.10	11
3940265_3	MGC_TP13_0.5	17/07/2025	0.5	5	10.10	16	10	23	10.10	12
3940265_7	MGC_TP14_0.4	17/07/2025	0.4	4	10.10	10	5	11.1	10.10	7
3940265_8	MGC_TP14_0.6	17/07/2025	0.6	4	10.10	10	5	10.6	10.10	8
3940265_23	MGC_TP18_0.3	17/07/2025	0.3	4	10.10	13	7	16.2	10.10	9
3940265_25	MGC_TP18_1.0	17/07/2025	1.0	4	10.10	14	8	17	10.10	10
3945293_1	MGC_HA40_0.0	24/07/2025	Surface	5	10.10	8	3	5.6	10.10	6
3945293_3	MGC_HA41_0.0	24/07/2025	Surface	4	10.10	10	5	12.2	10.10	8
3945293_5	MGC_HA42_0.0	24/07/2025	Surface	-	0.3	10	14	24	10.10	8
3945293_7	MGC_HA43_0.0	24/07/2025	Surface	4	5.6	6	5	5.6	10.10	5
3945293_9	MGC_HA44_0.0	24/07/2025	Surface	8	0.13	10	12	21	10.10	9
3882108_30	QAQC1_070525	07/05/2025	-	5	9	9	4	5.7	10.10	7
3939403_49	QAQC1_160725	16/07/2025	-	5	10.10	9	4	7.8	10.10	7

Annotations

(-) Not Analysed

BDL - Below Detection Limit

- MfE 2012. User's Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2012 – Soil contaminant standards for 'Commercial/Industrial outdoor worker (unpaved) scenario'.
- Australian National Environmental Protection (Assessment of Site Contamination) Measure (NEPC 1999, amended 2013). Volume 2, Schedule B1, Table 1A(1) Health Investigation Levels for Soil Contaminants.
- HEPA, March 2025. PFAS NEMP 2025 HIL D Industrial/commercial
- Landscape Research, July 2023. An implementation framework for ecological soil guideline values (Envirolink Grant C09X2206). Prepared for Contaminated Land and Waste Special Interest Group and Land Monitoring Forum. Ecological soil guideline values (Eco-SGV) for 'Investigation Trigger (80%)' used, Tables 6 and 16 used.
- Canadian Environmental Quality Guidelines (CCME) - Soil Quality Guidelines for the Protection of Environmental and Human Health. Canadian Council of Ministers of the Environment. Values for 'commercial' use.
- HEPA, March 2025. PFAS NEMP 2025. For 'ecological direct exposure – all land uses' and 'interim ecological indirect exposure, intensive developed sites', values from Table 6 used.
- MfE Hazardous Waste Guidelines. Landfill Waste Acceptance Criteria and Landfill Classification, 2004. Values for 'Class A waste acceptance criteria'
- URS New Zealand Ltd, 2003. Determinations of Common Pollutant Background Soil Concentrations for the Wellington Region. Table ES-1: Target-analyte background soil concentration ranges for the Wellington region. Values for 'Main Soil Type 2 (Greywacke)'

Concentrations exceeding human health criteria are in teal
Concentrations above environmental assessment criteria are in italics
Concentrations exceeding MfE Class A WAC are in red
Concentrations above background concentrations are bold

PFAS							
Perfluorooctanoic acid in soil (PFOA)	L-PFHs	Perfluorohexanesulfo nic acid - Total	L-PFOS	Perfluorooctane sulfonic acid - Branched (B-PFOS)	Perfluorooctanesulfo nic acid - Total	The numerical sum of Total PFHs and Total PFOS	Total of Reported PFAS in Soil
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
-	-	-	-	-	-	-	-
50	-	20	-	-	20	20	-
-	-	-	-	-	-	-	-
10 (0.005)*	-	-	-	-	1	-	-
0.14	-	-	-	-	0.14 †	-	-
-	-	-	-	-	-	-	-
50	-	-	-	-	-	20	-
-	-	-	-	-	-	-	-
50	-	-	-	-	-	14	-
-	-	-	-	-	-	-	-

NESCS Commercial/industrial outdoor worker (unpaved) ¹							
PFAS NEMP 2025 HIL D Industrial/commercial							
Eco SGVs Investigation Trigger (80%) Values ³							
PFAS NEMP 2025 Ecological direct exposure – all land uses ⁴							
PFAS NEMP 2025 Interim ecological indirect exposure, intensively developed sites ⁴							
MfE Hazardous Waste Guidelines Class A Screening ⁵							
PFAS NEMP 2025 Interim Landfill - Unlined ⁶							
WasteMINZ Class 5 WAC for Organic Elements ⁷							
Silverstream Landfill Acceptance Criteria							
Wellington Region Background (Greywacke) ⁸							

Sample Code	Field ID	Date	Depth (m bgl)	Perfluorooctanoic acid in soil (PFOA)	L-PFHs	Perfluorohexanesulfo nic acid - Total	L-PFOS	Perfluorooctane sulfonic acid - Branched (B-PFOS)	Perfluorooctanesulfo nic acid - Total	The numerical sum of Total PFHs and Total PFOS	Total of Reported PFAS in Soil
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
3882108_44	Composite 9 (Composite of MGC_HA01_0.0 & MGC_HA02_0.1 T)	08/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3882108_45	Composite 10 (Composite of MGC_HA03_0.1 G, MGC_HA04_0.1 G & MGC_HA05_0.1 G)	08/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3882108_46	Composite 11 (Composite of MGC_HA06_0.1 F, MGC_HA07_0.1 F, MGC_HA08_0.1 F & MGC_HA09_0.1 F)	08/05/2025	Surface	<0.0010	<0.0010	<0.0010	0.0047	<0.0010	0.0051	0.0053	<0.046
3882108_47	Composite 12 (MGC_HA14_0.1 F, MGC_HA15_0.1 F, MGC_HA16_0.1 F & MGC_HA17_0.1 F)	08/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_60	Composite 21 (Composite of MGC_HA18_0.1 G, MGC_HA19_0.1 G, MGC_HA20_0.1 G & MGC_HA21_0.1 G)	09/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_61	Composite 22 (MGC_HA22_0.1 F, MGC_HA23_0.1 F, MGC_HA24_0.1 F & MGC_HA25_0.1 F)	09/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_62	Composite 23 (Composite of MGC_HA31_0.1 T & MGC_HA32_0.1 T)	09/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_63	Composite 24 (Composite of MGC_HA36_0.1 T & MGC_HA37_0.1 T)	09/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3882108_11	MGC_HA06_0.1 F	07/05/2025	Surface	<0.0010	<0.0010	<0.0010	0.020	0.0019	0.022	0.023	<0.046
3882108_12	MGC_HA06_0.3 F	07/05/2025	0.3	<0.0010	<0.0010	<0.0010	0.0102	<0.0010	0.0112	0.0115	<0.046
3882108_13	MGC_HA07_0.1 F	07/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3882108_15	MGC_HA08_0.1 F	07/05/2025	Surface	<0.0010	<0.0010	<0.0010	0.0020	<0.0010	0.0021	0.0023	<0.046
3882108_31	MGC_HA08_0.3 F	07/05/2025	0.3	<0.0010	<0.0010	<0.0010	0.0050	<0.0010	0.0053	0.0056	<0.046
3882108_16	MGC_HA09_0.1 F	07/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3882108_18	MGC_HA10_0.1 O	07/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3882108_24	MGC_HA13_0.1 O	07/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_23	MGC_HA27_0.1 O	08/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_25	MGC_HA28_0.1 O	08/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_30	MGC_HA30_0.1 O	08/05/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3883331_46	MGC_HA37_0.3 T	08/05/2025	0.3	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3939403_33	MGC_TP09_0.0	16/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	0.0020	0.0021	<0.046
3939403_34	MGC_TP09_0.3	16/07/2025	0.3	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3939403_36	MGC_TP09_1.0	16/07/2025	1.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3939403_37	MGC_TP10_0.0	16/07/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3939403_41	MGC_TP11_0.0	16/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0137	<0.0010	0.0146	0.0154	<0.046
3939403_42	MGC_TP11_0.3	16/07/2025	0.3	<0.0010	0.0012	0.0013	0.017	0.0011	0.0181	0.0194	<0.046
3939403_43	MGC_TP11_0.5	16/07/2025	0.5	<0.0010	0.0012	0.0013	0.027	0.0120	0.039	0.040	<0.046
3939403_44	MGC_TP11_1.0	16/07/2025	1.0	<0.0010	<0.0010	0.001	0.017	0.012	0.029	0.03	<0.046
3939403_45	MGC_TP12_0.0	16/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0058	<0.0010	0.0063	0.0064	<0.046
3939403_48	MGC_TP12_1.0	16/07/2025	1.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3940265_1	MGC_TP13_0.0	17/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0033	<0.0010	0.0036	0.0037	<0.046
3940265_4	MGC_TP13_1.0	17/07/2025	1.0	<0.0010	0.0026	0.0029	<0.0010	<0.0010	0.0029	0.0029	<0.046
3940265_5	MGC_TP14_0.0	17/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	0.0013	0.0014	<0.046
3940265_9	MGC_TP14_1.0	17/07/2025	1.0	<0.0010	0.0014	0.0015	0.123	0.08	0.2	0.2	0.21
3940265_10	MGC_TP15_0.0	17/07/2025	Surface	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3940265_14	MGC_TP16_0.0	17/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0155	0.0019	0.0174	0.0176	<0.046
3940265_15	MGC_TP16_0.3	17/07/2025	0.3	<0.0010	0.0012	0.0012	0.004	0.0043	0.0082	0.0095	<0.046
3940265_16	MGC_TP16_0.5	17/07/2025	0.5	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	0.0012	<0.046
3940265_17	MGC_TP16_1.0	17/07/2025	1.0	<0.0010	<0.0010	0.001	<0.0010	<0.0010	<0.0010	0.0011	<0.046
3940265_18	MGC_TP17_0.0	17/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0126	0.0031	0.0157	0.0160	<0.046
3940265_19	MGC_TP17_0.3	17/07/2025	0.3	<0.0010	<0.0010	<0.0010	0.0045	<0.0010	0.0049	0.0052	<0.046
3940265_20	MGC_TP17_0.5	17/07/2025	0.5	<0.0010	<0.0010	<0.0010	0.068	0.017	0.085	0.085	0.085
3940265_21	MGC_TP17_1.0	17/07/2025	1.0	<0.0010	0.0018	0.0019	0.0033	<0.0010	0.0041	0.0060	<0.046
3940265_22	MGC_TP18_0.0	17/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0065	<0.0010	0.0068	0.0069	<0.046
3940265_23	MGC_TP18_0.3	17/07/2025	0.3	<0.0010	<0.0010	<0.0010	0.0056	0.0014	0.0070	0.0072	<0.046
3940265_24	MGC_TP18_0.5	17/07/2025	0.5	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	0.0016	<0.046
3940265_25	MGC_TP18_1.0	17/07/2025	1.0	<0.0010	<0.0010	<0.0010	0.0047	0.0018	0.0065	0.0072	<0.046
3940265_30	MGC_TP20_0.0	17/07/2025	Surface	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	0.0013	0.0013	<0.046
3940265_31	MGC_TP20_0.3	17/07/2025	0.3	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046
3940265_24	MGC_TP20_1.0	17/07/2025	1.0	<0.0010	<0.0010	<0.0010	0.001	<0.0010	0.0014	0.0018	<0.046
3882108_30	QAQC1_070525	07/05/2025	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.046

Annotations

- (-) Not Analysed
- BDL - Below Detection Limit
- 1 - MfE 2012. User's Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2012 – Soil contaminant standards for 'Commercial/Industrial outdoor worker (unpaved) scenario.
- 2 - HEPA, March 2025, PFAS NEMP 2025 HIL D Industrial/commercial
- 3 - Landcare Research, July 2023. An implementation framework for ecological soil guideline values (Envirolink Grant C09X2206). Prepared for Contaminated Land and Waste Special Interest Group and Land Monitoring Forum. Ecological soil guideline values (Eco-SGV) for 'Investigation Trigger (80%)' used. Tables 6 and 16 used.
- 4 - HEPA, March 2025, PFAS NEMP 2025. For 'ecological direct exposure – all land uses' and 'interim ecological indirect exposure, intensively developed sites', values from Table 6 used.
- 5 - MfE Hazardous Waste Guidelines. Landfill Waste Acceptance Criteria and Landfill Classification, 2004. Values for 'Class A waste acceptance criteria'
- 6 - HEPA, March 2025, PFAS NEMP 2025. Values from Table 11 for 'Interim Landfill - Unlined' used.
- 7 - WasteMINZ, October 2022. Technical Guidelines for Disposal to Land (Rev 3). Values from Table H-1 - 'Class 5' used.
- 8 - URS New Zealand Ltd, 2003. Determinations of Common Pollutant Background Soil Concentrations for the Wellington Region. Table ES-1: Target analyte background soil concentration ranges for the Wellington region. Values for 'Main Soil Type 2 (Greywacke)'

Concentrations exceeding human health criteria are in teal
Concentrations above environmental assessment criteria are in italics
Concentrations exceeding WAC are in red
Concentrations above background concentrations are bold

	PAH												SVOCs			TPH				
	B(a)P PEF (NZ NES)	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Fluoranthene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	2,4,6-TP	4,4-DDE	DDT	DDT (total)	59 Additional compounds Analysed	C7 - C9	C10 - C14	C15 - C36	Total hydrocarbons (C7 - C36)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NESCS Commercial/industrial outdoor worker (unpaved) ¹	35	-	-	-	-	-	-	-	-	-	-	-	-	1,000	-	-	-	-	-	-
MFE Module 4, Tier 1 Residential (SANDY SILT) ²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500	510	NA *	-	-
PFAS NEMP 2025 HIL D Industrial/commercial ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eco SGVs Investigation Trigger (80%) Values ⁴	-	-	-	22	-	-	89	-	-	-	-	-	-	4.8	-	130	110	1,300	-	-
PFAS NEMP 2025 Ecological direct exposure – all land uses ⁵	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PFAS NEMP 2025 Interim ecological indirect exposure, intensively developed sites ⁶	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MFE Hazardous Waste Guidelines Class A Screening ⁷	300	-	-	300	-	-	-	200	-	-	-	-	500	500	-	-	-	-	-	-
PFAS NEMP 2025 Interim Landfill - Unlined ⁷	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WasteMINZ Class 5 WAC for Organic Elements ⁸	-	-	-	2	-	-	-	-	-	-	-	-	0.7	-	-	110	58	-	-	-
Silverstream Landfill Acceptance Criteria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wellington Region Background (Greywacke) ⁹	-	0.05	-	0.27	-	-	0.55	-	0.01	0.26	0.57	-	-	-	-	-	-	-	-	190

Sample Code	Field ID	Date	Depth (m bgl)	B(a)P PEF (NZ NES)	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Chrysene	Fluoranthene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	2,4,6-TP	4,4-DDE	DDT	DDT (total)	59 Additional compounds Analysed	C7 - C9	C10 - C14	C15 - C36	Total hydrocarbons (C7 - C36)
3882108_32	Composite 1 (Composite of MGC_HA01_0.0 & MGC_HA02_0.1_T)	08/05/2025	Surface	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.012	<0.012	<0.07	-	-	-	-
3882108_34	Composite 3 (Composite of MGC_HA03_0.1_G, MGC_HA04_0.1_G & MGC_HA05_0.1_G)	08/05/2025	Surface	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.012	<0.012	<0.08	-	-	-	-
3883331_52	Composite 13 (Composite of MGC_HA18_0.1_G, MGC_HA19_0.1_G, MGC_HA20_0.1_G & MGC_HA21_0.1_G)	09/05/2025	Surface	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.012	<0.012	<0.07	-	-	-	-
3883331_56	Composite 17 (Composite of MGC_HA31_0.1_T & MGC_HA32_0.1_T)	09/05/2025	Surface	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.011	0.018	<0.07	-	-	-	-
3883331_58	Composite 19 MGC_HA36_0.1_T & MGC_HA37_0.1_T)	09/05/2025	Surface	-	-	-	-	-	-	-	-	-	-	-	-	-	0.044	0.015	<0.07	-	-	-	-
3882108_18	MGC_HA10_0.1_O	07/05/2025	Surface	<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	<1.0	-	BDL	-	-	-	-
3882108_24	MGC_HA13_0.1_O	07/05/2025	Surface	<1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	-	BDL	-	-	-	-	-
3883331_23	MGC_HA27_0.1_O	08/05/2025	Surface	<1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	-	BDL	-	-	-	-	-
3883331_25	MGC_HA28_0.1_O	08/05/2025	Surface	<1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	-	BDL	-	-	-	-	-
3883331_30	MGC_HA30_0.1_O	08/05/2025	Surface	<1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	-	BDL	-	-	-	-	-
3939403_35	MGC_TP09_0.5	16/07/2025	0.5	<0.027	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.06	<0.011	<0.011	-	-	-	-	-	-	-	-	-
3939403_42	MGC_TP11_0.3	16/07/2025	0.3	<0.028	<0.012	<0.012	<0.012	0.013	<0.012	0.016	<0.012	<0.06	<0.012	0.017	-	-	-	-	-	-	-	-	-
3939403_43	MGC_TP11_0.5	16/07/2025	0.5	<0.028	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.06	<0.012	<0.012	-	-	-	-	-	-	-	-	-
3940265_3	MGC_TP13_0.5	17/07/2025	0.5	<0.026	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.06	<0.011	<0.011	-	-	-	-	-	-	-	-	-
3940265_7	MGC_TP14_0.4	17/07/2025	0.4	<0.027	<0.011	0.013	0.016	0.017	<0.011	0.024	<0.011	<0.06	<0.011	0.027	-	-	-	-	-	-	-	-	-
3940265_8	MGC_TP14_0.6	17/07/2025	0.6	<0.027	<0.011	0.015	0.017	0.018	0.012	0.027	0.011	<0.06	<0.011	0.027	-	-	-	-	-	-	-	-	-
3940265_23	MGC_TP18_0.3	17/07/2025	0.3	<0.027	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.06	<0.011	<0.011	-	-	-	-	-	-	-	-	-
3940265_25	MGC_TP18_1.0	17/07/2025	1.0	<0.027	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.06	<0.012	<0.012	-	-	-	-	-	-	-	-	-	-
3940265_33	MGC_TP20_1.0	17/07/2025	1.0	0.05	<0.013	0.025	0.032	0.04	0.027	0.056	0.026	<0.07	0.039	0.055	-	-	-	-	-	<20	<20	<40	<80
3882108_30	QAQC1_070525	07/05/2025	-	<1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	-	BDL	-	-	-	-	-

Annotations

- * NA indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site (i.e. TPH >20,000 mg/kg)
- (-) Not Analysed
- BDL - Below Detection Limit
- 1 - MFE 2012. User's Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health 2012 – Soil contaminant standards for 'Commercial/industrial outdoor worker (unpaved) scenario.
- 2 - Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (revised 2011). Module 4 values applicable to SANDY SILT soils <1m in depth 'residential' (Table 4.11 & 4.14) land use scenario (i.e.
- 3 - HEPA, March 2025, PFAS NEMP 2025 HIL D Industrial/commercial
- 4 - Landcare Research, July 2023. An implementation framework for ecological soil guideline values (Envirolink Grant C09X2206). Prepared for Contaminated Land and Waste Special Interest Group and Land Monitoring Forum. Ecological soil guideline values (Eco-SGV) for 'Investigation Trigger (80%)' used. Tables 6 and 16 used. Where relevant, values for 'fine' soils used.
- 5 - HEPA, March 2025, PFAS NEMP 2025. For 'ecological direct exposure – all land uses' and 'Interim ecological indirect exposure, intensively developed sites', values from Table 6 used.
- 6 - MFE Hazardous Waste Guidelines. Landfill Waste Acceptance Criteria and Landfill Classification, 2004. Values for 'Class A waste acceptance criteria'
- 7 - HEPA, March 2025, PFAS NEMP 2025. Values from Table 11 for 'Interim Landfill - Unlined' used.
- 8 - WasteMINZ, October 2022. Technical Guidelines for Disposal to Land (Rev 3). Values from Table H-1 - 'Class 5' used.
- 9 - URS New Zealand Ltd, 2003. Determinations of Common Pollutant Background Soil Concentrations for the Wellington Region. Table ES-1: Target analyte background soil concentration ranges for the Wellington region. Values for 'Main Soil Type 2 (Greywacke)'

Concentrations exceeding human health criteria are in teal
Concentrations above environmental assessment criteria are in italics
Concentrations exceeding WAC are in red
Concentrations above background concentrations are bold

PFAS						
mono-PFOS	Perfluorooctane-1-sulfonic acid linear isomer (L-PFOS)	Perfluorooctane sulfonic acid (PFOS)	methy/perfluoroheptanesulfonic acid isomers	Perfluorooctanoic acid (PFOA)	Perfluorohexane sulfonic acid (PFHxS)	Sum of PFHxS and PFOS
µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
-	-	<u>0.13</u>	-	<u>220</u>	-	-
-	-	<i>0.48</i>	-	-	-	-
-	-	13	-	-	-	-
-	-	0.07	-	0.56	0.07	0.07
-	-	7	-	56	7	7

PFAS NEMP 2025 Interim Marine 95% ¹
ANZG 2023 Interim Freshwater 95% ²
Dilution Attenuation Factor Applied ³
PFAS NEMP 2025 Unlined Landfill Acceptance Criteria ⁴
PFAS NEMP 2025 Double Composite Lined Landfill Acceptance Criteria ⁴

Lab Report No.	Sample Code	Method	Field ID	Date	Depth (m bgl)	<0.050	0.32	0.32	<0.025	<0.025	<0.025	0.32
25-179563	25-179563-5	SPLP (Reagent Water)	Composite of MGC_HA06_0.1_F & MGC_HA06_0.3_F	19/07/2025	-	<0.050	0.32	0.32	<0.025	<0.025	<0.025	0.32
25-179563	25-179563-5	TCLP (pH 5 acetate)	Composite of MGC_HA06_0.1_F & MGC_HA06_0.3_F	19/07/2025	-	0.033	0.22	<u>0.25</u>	<0.025	<0.025	<0.025	0.25
25-179563	25-179563-6	SPLP (Reagent Water)	Composite of MGC_HA08_0.1_F & MGC_HA08_0.3_F	19/07/2025	-	<0.050	0.18	<u>0.18</u>	<0.025	<0.025	<0.025	0.18
25-179563	25-179563-6	TCLP (pH 5 acetate)	Composite of MGC_HA08_0.1_F & MGC_HA08_0.3_F	19/07/2025	-	<0.051	0.13	<u>0.13</u>	<0.025	<0.025	<0.025	0.13
25-200085	25-200085_25-200085-1A	SPLP (Reagent Water)	MGC_TP09_0.0	16/07/2025	0.0	<0.052	0.049	0.049	<0.025	<0.025	<0.025	0.049
25-200139	25-200139_25-200139-1A	SPLP (Reagent Water)	MGC_TP16_0.0	17/07/2025	0.0	<0.054	0.36	0.41	0.051	<0.025	<0.025	0.41
25-200139	25-200139_25-200139-2A	SPLP (Reagent Water)	MGC_TP17_0.0	17/07/2025	0.0	<0.055	0.61	0.74	0.13	<0.025	<0.025	0.74
25-200139	25-200139_25-200139-3A	SPLP (Reagent Water)	MGC_TP18_0.0	17/07/2025	0.0	<0.056	0.27	0.27	<0.025	<0.025	<0.025	0.27

Environmental Standards

1 - HEPA 2025. PFAS National Environmental Management Plan Version 3.0. Table 5 – Ecological water quality guideline values. Values for 'interim marine' and '95% species protection value' used for PFOS and PFOA.

2 - Australian and New Zealand Guidelines for Fresh and Marine Water Quality, May 2023. Toxicant Default Guideline Values for Aquatic Ecosystem Protection, Perfluorooctane Sulfonate (PFOS) in Freshwater, Draft Technical Brief. Values for '95% species protection value' used for PFOS.

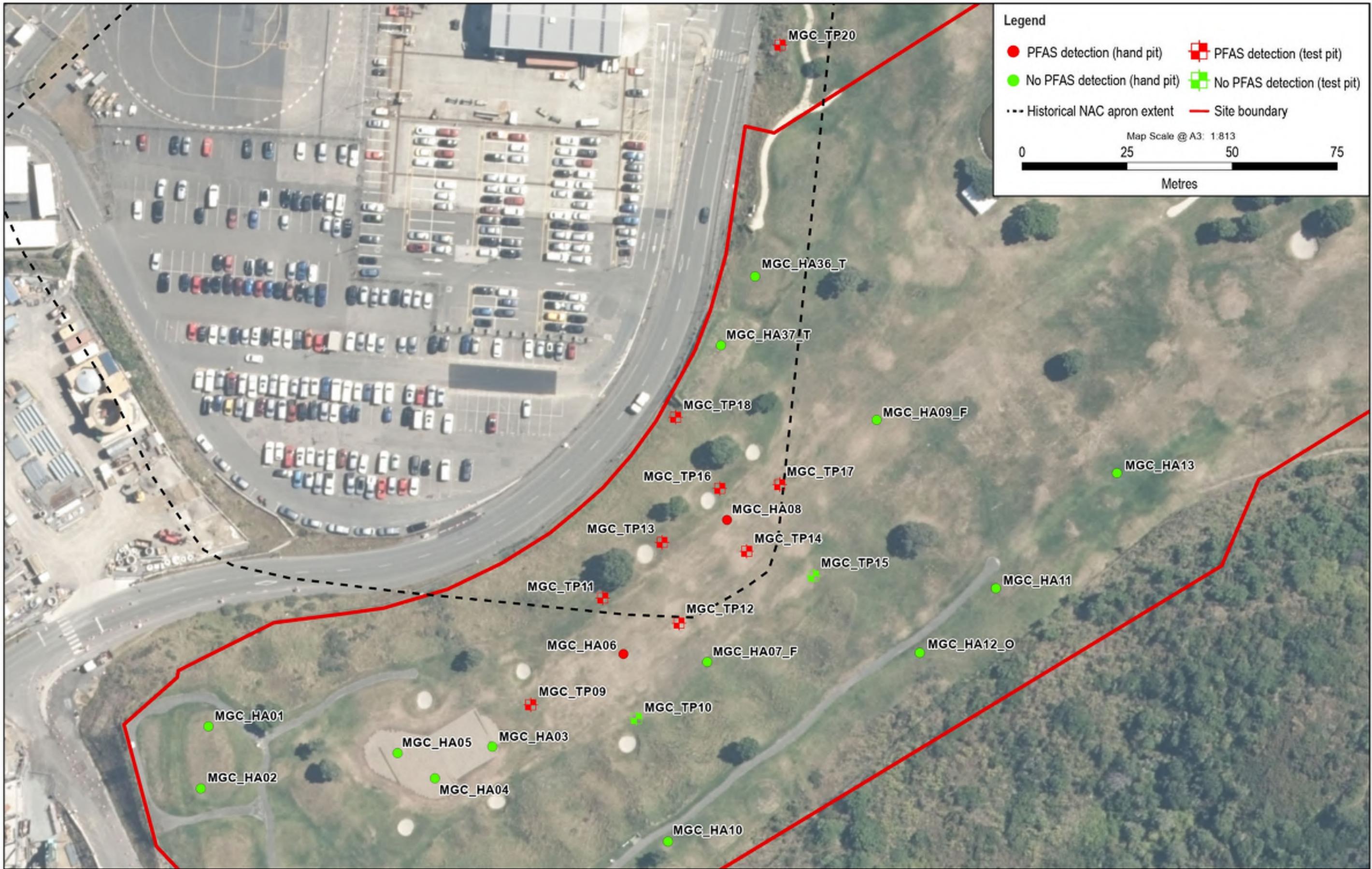
3 - Dilution attenuation factor (DAF) calculated using a factor of 100 multiplied by the ANZG 2018 interim marine criteria.

4 - HEPA 2020. PFAS National Environmental Management Plan Version 3.0'. Table 7 – Criteria provided for unlined, and double composite lined. 'ASLP Leachable Concentration' values used for sum PFOS+PFHxS and PFOA.

Concentrations above the ANZG 2023 interim freshwater 95% criteria are italicised
Concentrations above the ANZG 2018 x DAF of 100 are in red
Concentrations exceeding the unlined landfill WAC are in bold
Concentrations exceeding double composite lined landfill WAC are in teal

J

Appendix J – PFAS Detections

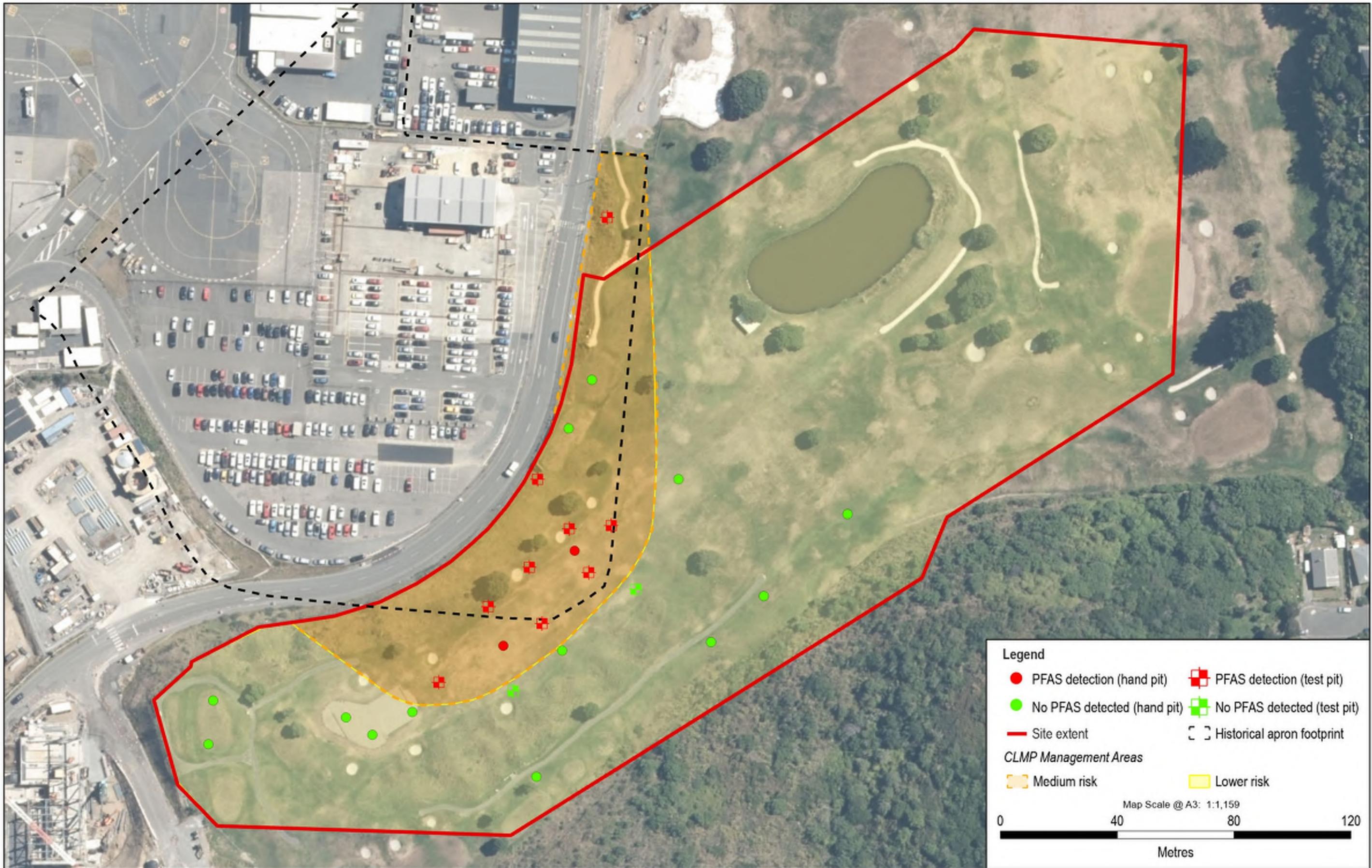


	Revision	Drawer	Verified	Approved	Date	MIRAMAR GOLF COURSE PFAS DETECTIONS	Client:			Discipline:	ENVIRONMENTAL
	1	MA			15.08.25		Project:			SEA DEFENCES STRUCTURES RENEWAL	Drawing No.:
	2	GJS			03.09.25						
	3	GJS			07.10.25						

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K

Appendix K – CLMP Works Areas



Legend

- PFAS detection (hand pit)
- No PFAS detected (hand pit)
- PFAS detection (test pit)
- No PFAS detected (test pit)
- Site extent
- Historical apron footprint

CLMP Management Areas

- Medium risk
- Lower risk

Map Scale @ A3: 1:1,159

0 40 80 120

Metres

	Revision	Drawer	Verified	Approved	Date	MGC YARD CLMP MANAGEMENT AREAS
	1	MA			15.08.25	
	2	GJS			03.09.25	
	2	GJS			07.10.25	

Client: **WLG**

Project: **SEA DEFENCES STRUCTURES RENEWAL**

Beca

Discipline: **ENVIRONMENTAL**

Drawing No. **3324338-09.09**

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