MFS Camden Park Station

Supplementary Detailed Site Investigation

South Australian Metropolitan Fire Service

18 December 2024

→ The Power of Commitment

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Executive Summary

Background

GHD Pty Ltd (GHD) was commissioned by the South Australian (SA) Metropolitan Fire Service (MFS) to undertake a supplementary Detailed Site Investigation (DSI) for the Camden Park Fire Station at 65 Morphett Road, Camden Park, South Australia 5038 (the site). Historically, the MFS has used AFFF containing PFAS at the site during training activities. Residual AFFF was also flushed from firefighting appliances on-site after emergency response incidents.

To assist the MFS in meeting the requirements prescribed by the SA EPA (GENI 63256), GHD completed a PSI for the MFS Camden Park Station in 2023 (GHD, 2023a), and subsequently an SAQP (GHD, 2023b) and DSI (GHD, 2024). Further contamination investigations were recommended and are covered in this document.

Objectives

The objective of the supplementary DSI is to address the recommendations in the DSI report (GHD, 2024) and SA EPA response letter (EPA GENI 63256) in understanding the nature and extent of potential off-site PFAS contamination hydraulically downgradient of the site. Specifically, this report seeks to:

– Provide further information about the extent and concentration of off-site migration of the PFAS contamination plume in groundwater
– Understand the PFAS impacts migrating off-site via surface water by sampling stormwater and sediment
– Update the conceptual site model based on the above and, therefore, the risks to relevant receptors

Scope of Work

– Drilling preliminaries and installation of three (3) off-site groundwater monitoring wells, two (2) located hydraulically downgradient from the site and one (1) located hydraulically upgradient from the site.
    - Opportunistic soil sampling during the drilling of the groundwater monitoring wells for analysis of PFAS.
– Development of the three (3) off-site groundwater monitoring wells.
– One (1) subsequent groundwater monitoring event (GME) of the three (3) newly installed off-site wells and the three (3) previously installed groundwater monitoring wells located on-site for analysis of PFAS.
– Survey of the three (3) newly installed off-site wells.
– Two (2) surface water samples from a stormwater collection pit and the Brownhill Creek stormwater inlet point were collected for analysis of PFAS.
– Assess the potential for impacted surface water run-off to serve as a pathway for the migration of PFAS to nearby surface water receptors.
– Review and refinement of the CSM developed for the site.

Conclusions:

The scope of work was restricted to the assessment of PFAS and did not include other potential contaminants.

– The lithologies encountered beneath the site are consistent with the Pooraka Formation, with sand, sandy clay and clay identified below the fill material.
– Shallow groundwater was encountered between 1.1 - 1.7 m bgl.
– Off-site registered wells close to and down-gradient of the site have natural background salinities in the water that are unsuitable for drinking water and irrigation purposes. While groundwater could be used for recreational purposes such as filling swimming pools, the groundwater monitoring results on- and off-site did not exceed the PFAS recreational water use criteria.
– PFAS concentrations identified in groundwater upgradient from the site were of a similar order of magnitude to those identified downgradient from the site.
– Simulated surface water discharge from the site to stormwater identified no impacts from PFAS.

– PFAS impacts on downgradient surface water environments are likely due to other sources not associated with the MFS Camden Park Site.

Recommendations:

– If required by future development/activities at the site, a PFAS management plan should be developed to address handling PFAS-impacted materials.

Limitations

This report is subject to and must be read in conjunction with the limitations set out in Section 1.6 and the assumptions and qualifications contained throughout the report.

Table of Abbreviations

Abbreviation	Full Form
ADWG	Australian Drinking Water Guidelines
AFAC	Australasian Fire and Emergency Service Authorities Council
AFFF	Aqueous Film-Forming Foam
AHD	Australian Height Datum
COC	Chain of Custody
COPC	Chemicals of Potential Concern
CSM	Conceptual Site Model
DO	Dissolved Oxygen
DQIs	Data Quality Indicators
DQOs	Data Quality Objectives
EC	Electrical Conductivity
GAR	South Australian *Guidelines for the Assessment and Remediation of Site Contamination 2019*
GHD	GHD Pty Ltd
HEPA	Heads of Environment Protection Authorities Australia
HDPE	High-Density Polyethylene
HIL	Human Health Investigation Level
IP	Interface Probe
JSEA	Job Safety and Environment Analysis
LDPE	Low-Density Polyethylene
LOR	Limit of Reporting
m bgl	Metres Below Ground Level
MFS	South Australian Metropolitan Fire Service
mg/L	Milligrams/Litre
MW	Monitoring Well
NATA	National Association of Testing Authorities
NEMP	PFAS National Environmental Management Plan Version 2.0 - January 2020
NEPC	National Environmental Protection Council
NHMRC	National Health and Medical Research Council
ORP	Oxidation-Reduction Potential
PFAS	Per- and Poly-Fluoroalkyl Substances
PFHxS	Perfluorohexane Sulfonate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PFPeA	Perfluoropentanoic acid
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percentage Difference

Abbreviation	Full Form
SA EPA	South Australian Environment Protection Authority
SAQP	Sampling and Analysis Quality Plan
SOP	Standard Operating Procedure
SPR	Source-Pathway-Receptor
SWL	Standing Water Level
TDS	Total Dissolved Solids
TOC	Top of Casing
VSCAP	Voluntary Site Contamination Assessment Proposal
WQEPP	South Australian *Environmental Protection (Water Quality) Policy* 2015
µg/L	Micrograms/litre
µS/cm	Microsiemens/centimetre

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Appendices

1. Introduction

GHD Pty Ltd (GHD) was commissioned by the South Australian (SA) Metropolitan Fire Service (MFS) to undertake further intrusive assessment works in the form of a supplementary Detailed Site Investigation (DSI) for the Camden Park Fire Station at 65 Morphett Road, Camden Park, South Australia 5038 (the site). The works have been requested in a letter issued by the SA EPA (EPA GENI 63256 - Appendix A).

This report outlines the additional investigation works undertaken to assess the nature and extent of off-site PFAS impacts in soil, sediments, surface water, and groundwater hydraulically downgradient of the site (northwest) associated with on-site sources of contamination.

1.1 Background

Historically, the MFS has used AFFF containing PFAS at the site during training activities. However, it is understood that the MFS commenced phasing out the use of AFFF containing perfluorooctane sulfonate (PFOS) in 2007 and perfluorooctanoic acid (PFOA) in 2014 after conducting consultation and liaison with the Australasian Fire and Emergency Service Authorities Council (AFAC) and the SA EPA. The MFS replaced all firefighting foam concentrate in 2016. Currently, all MFS appliances utilise firefighting foams that are classified as fluorine-free. During 2017/2018, the MFS removed all fire extinguishers containing PFAS from their inventory.

In 2022, GHD undertook a site history review of 17 MFS sites (GHD 2022) as part of an environmental risk profiling exercise using a multi-criteria analysis approach. This work was initiated to address the potential risks associated with the former use of AFFF-containing PFAS. The sites were prioritised to assist with implementing appropriate assessment and management measures to address the potential PFAS risks. The GHD 2022 Report was submitted to the SA EPA, which subsequently issued a response letter requiring further investigation (EPA GENI 62917).

In 2023, GHD undertook a Preliminary Site Investigation (PSI) at the Camden Park site, which identified that training exercises using PFAS were not conducted at the site. Still, AFFF was stored at the site and present in trucks at the site as early as 1994 (GHD, 2023a). Subsequently, a Sampling and Analysis Quality Plan (SAQP) was prepared (GHD, 2023b), and a DSI (GHD, 2024) was undertaken. The DSI report identified the presence of PFAS on-site in soil and groundwater. Further work was recommended to provide a better understanding of the off-site impacts of PFAS on groundwater.

Following the SA EPA review of the DSI report (GHD, 2024), recommendations to determine whether surface water migrating from the site impacts receiving waters and presents a risk to ecological receptors were outlined in the SA EPA response letter (EPA GENI 63256). The scope of work outlined in this report addresses the recommendations.

1.2 Purpose

The purpose of this report is to increase the understanding of the risk to off-site receptors by PFAS contamination from the site from migration of contaminated groundwater and surface water as per the recommendations in the DSI report (GHD, 2024) and SA EPA response letter (EPA GENI 63256).

1.3 Objectives

The objective of the supplementary DSI is to:

– Install a series of off-site groundwater monitoring wells down-hydraulic gradient, progressively further away from the site, to assess the lateral extent of groundwater impacts and potential terrestrial ecosystem exposure risks via the groundwater pathway.

– Conduct a groundwater-use survey near the site to evaluate the potential exposure risk attributable to the possible use of groundwater for wells with an undefined or domestic purpose.
– Investigations to determine whether surface water migrating from the site is impacting receiving waters and presenting a risk to ecological receptors.
– Development of a community engagement plan, where off-site investigations are planned.
– Update the conceptual site model based on the above and the risks to relevant receptors.

1.4 Scope of works

To achieve the above objectives, the scope of work for the supplementary DSI was as follows:

Supplementary field investigations and analysis

– Drilling preliminaries, such as permit applications, service clearance and health, safety and environment (HSE) documentation preparation.
– Three (3) off-site groundwater monitoring wells were installed, two (2) located hydraulically downgradient from the site and one (1) located hydraulically upgradient from the site.
  - Opportunistic soil sampling during the drilling of the groundwater monitoring wells for analysis of PFAS.
– Development of the three (3) off-site groundwater monitoring wells.
– One (1) subsequent groundwater monitoring event (GME) of the three (3) newly installed off-site wells and the three (3) previously installed groundwater monitoring wells located on-site for analysis of PFAS
– Survey of the three (3) newly installed off-site wells.
– Two (2) surface water samples were collected from a stormwater collection pit and Brownhill Creek stormwater inlet point for analysis of PFAS.
– Assess the potential for impacted surface water run-off to serve as a pathway for the migration of PFAS to nearby surface water receptors.
– Review and refinement of the CSM developed for the site.

The scope of work will be restricted to the assessment of PFAS and will not include other potential contaminants.

1.5 Framework and Methodology

The assessment works and reporting will be undertaken per the EP Act, the Environment Protection Regulations 2009, relevant SA Environment Protection Policies (EPPs) and the following guidelines/standards:

– National Environment Protection (NEPC) (1999) National Environment (Assessment of Site Contamination) Protection Measure (ASC NEPM), National Environment Protection Council, as amended 2013
– HEPA (2020) PFAS National Environmental Management Plan, version 2.0 (PFAS NEMP)
– ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, www.waterquality.gov.au/anz-guidelines/about/how-to-use
– ANZ Standard AS/NZS 5667.1:1998 Water Quality – Sampling, Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples
– ANZ Standard AS/NZS 5667.11:1998 Water Quality – Sampling, Part 11: Guidance on Sampling of Groundwaters
– SA EPA (2018) Guideline for Communication and Engagement
– SA EPA (2019) Guidelines for the Assessment and Remediation of Site Contamination (the GAR)
– SA EPA (2019) Guidelines for Regulatory Monitoring and Testing – Groundwater Sampling

1.6 Limitations

This report: has been prepared by GHD for South Australian Metropolitan Fire Service and may only be used and relied on by South Australian Metropolitan Fire Service for the purpose agreed between GHD and South Australian Metropolitan Fire Service as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than South Australian Metropolitan Fire Service 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 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.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section 1.7 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

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.

1.7 Assumptions

The assessment, conclusions and recommendations outlined in this report are based on the following assumptions:

– The term PFAS refers to a large number of perfluorinated and polyfluorinated compounds. The primary analytical suite adopted for this assessment incorporated 28 compounds, including PFOS, PFHxS and PFOA, which are the primary focus of this report.
– The screening levels used in this report were consistent with the guidance provided by Australian regulators at the time of reporting.

2. Previous investigations

2.1 Previous investigations conducted by GHD

GHD carried out previous PFAS investigations at the MFS Camden Park Fire Station between 2019 and 2023. Details of these investigations can be found in the following reports:

- GHD (2019) *MFS State-wide Appliance and Station Sampling*, Report for South Australian Metropolitan Fire Service, May 2019.
- GHD (2022) *MFS 17 Fire Stations PFAS Risk Profiling*, Report for South Australian Metropolitan Fire Service, October 2022.
- GHD (2023a) *MFS Camden Park, Preliminary Site Investigation (PSI)*, Report for South Australian Metropolitan Fire Service, 2023.
- *GHD (2023b) MFS Camden Park, Sampling and Analysis Quality Plan (SAQP)*, Report for the South Australian Metropolitan Fire Service, 2023.
- GHD (2024) *MFS Camden Park Station, Detailed Site Investigation (DSI).* Report prepared for the South Australian Metropolitan Fire Service, 2024.

2.2 Key site information

General site details are summarised in Table 2.1. The Site location plan is depicted in Figure 1.

Table 2.1 Summary of General Site Identification Information

Item	Detail
Site Address:	65-69 Morphett Road Camden Park, SA 5038
Certificate of Title:	CT 5413/751
Legal Description:	Allotments 6, 7 and 8 deposited Plan 2237 in the area named Camden Park, Hundred of Adelaide
Local Government Authority:	City of West Torrens
Current Zoning:	Strategic Employment
Property Owner:	South Australian Metropolitan Fire Service
Current Site Use:	Operational Fire Station
Area:	2,771 m²
Site Elevation:	8 m Australian Height Datum (AHD)
Topography	The topography of the site and surrounding land is relatively flat and forms part of the Adelaide Plains, between the Gulf St Vincent to the west and the Mount Lofty Ranges to the east. The site sits at an elevation of approximately 8 m AHD.
Site Drainage	Except for some small garden beds, the site comprises sealed surfaces (buildings, concrete hardstands, pavers, etc.). Most stormwater is collected in nine stormwater drains along the eastern and southern site boundaries, which discharge into the municipal stormwater system on Albert Avenue to the north. Stormwater is discharged to the Sturt River and Patawalonga River, located southwest of the site, which flows to the Gulf St Vincent (Gov SA 2023).
Surface Water	The site's nearest natural surface water bodies are the Sturt River, 0.9 km southwest, and Brown Hill Creek/Willawilla, 1.2 km northwest. Both surface water bodies converge at the Sturt Overflow 2.0 km northwest of the site. Surface water then continues to flow westerly and discharges into the Patawalonga River and subsequently into the Gulf St Vincent, 2.6 km west of the site.

Item	Detail
	Wetlands associated with the Glenelg Golf Club lie approximately 0.7 km northeast of the site.
Geology	The PSI report (GHD 2023a) indicated that the Site surface geology is characterised by Pooraka formation consisting of clay, sand, carbonate earth, silt, and gravel lenses. The soil classification orders were identified as Rudosol at the Site and Chromosol in surrounding areas. On-site and to the northwest, Rudosol soils are characterised as coastal dunes and plains of calcareous and siliceous sands. Chromosols found southeast of the site are characterised by outwash plains with hard, alkaline red soils, small areas of cracking clay soils and various alluvial soils in the stream valleys. The site lies within a region of extremely low probability of potential acid sulphate soil (PASS) occurrence. Boreholes advanced on the site during the DSI indicate that the geology is consistent with the sands and sandy clays of the Pooraka formation.
Hydrogeology	According to the Department of Water, Land and Biodiversity Conservation Report (Gerges 2006), the site lies within 'hydrogeological zone 2A'. This hydrogeologically important, highly faulted zone connects zone 2 with zone 3. Limited information is available for deep aquifers; hence, the interpretation of major structures is speculative. Major features include up to four Quaternary aquifers and possibly three or four Tertiary aquifers. A search of the South Australian Resources Information Gateway (SARIG) database reported shallow groundwater in the vicinity of the site with standing water levels (SWL) of 2 - 5 m bgl, producing yields in the range of 0.5 - 2.5 L/second. Groundwater salinity ranged from 3000 - 7000 mg/L total dissolved solids (TDS). The inferred groundwater flow direction is to the northwest.

2.3 Previous investigations – key findings

Key information outlined in the DSI report (GHD, 2024) relating to this off-site investigation is detailed below:

- The lithologies that were encountered beneath the site are consistent with the Pooraka Formation, with sand and sandy clay identified below the sandy gravel and sand fill material.
- Shallow groundwater was encountered between 1.093 - 1.714 m bgl.
- Reported PFAS impacts to soil are likely due to the historical fire station activities undertaken, such as the flushing of vehicles and equipment in the washdown area and a historical incident where the tank of an appliance had to be emptied.
- Higher concentrations of PFOS in soils have been reported south of the washdown area around the Site stormwater pits and associated site drainage system between 0.4 - 0.7 m bgl. Although vertical delineation has not been achieved in all soil bores drilled in this investigation, PFAS concentrations continued to decrease below 0.4 - 0.7 m bgl. There were no reported concentrations that were above the criteria below this depth.
- Concentrations above the Tier 1 Australian Drinking Water Guidelines (ADWG) recommendations for human health drinking water were reported in all monitoring wells for Sum of PFHxS and PFOS (µg/L), with exceedance values ranging from 0.09 µg/L (MW02) to 0.68 µg/L (MW03), when compared to the adopted criteria of 0.07 µg/L.
- PFOS concentrations above the PFAS NEMP Freshwater - 99% for high conservation value systems criteria (0.00023 µg/L) were also reported in all three monitoring wells ranging from 0.04 - 0.06 µg/L.
- MW03 is located on the site's northwest corner, in the inferred direction of groundwater flow, down-gradient from the washdown area and associated site drainage. As MW03 reported the highest concentration for the Sum of PFHxS and PFOS, PFAS contamination likely extends off-site to the northwest.

The DSI report is recommended to be read in conjunction with this supplementary DSI report.

Analytical data from this investigation is available in Appendix G; sample locations are shown in Figure 2.

3. Off-site land and water use

3.1 Off-site land use

A summary of the uses of the land surrounding the site is provided in Table 3.1.

Table 3.1 Summary of Surrounding Land Use

Orientation	Description of Land Use	Zoning (Municipal Council)
North	Albert Avenue, commercial/industrial warehouse, followed by Patricia Avenue and low-density residential properties	Strategic Employment
East	Furniture manufacturer Carlisle Street, followed by residential properties.	Strategic Employment/General Neighbourhood
South	Furniture upholsterer and motor body repairs followed by residential properties.	Strategic Employment
West	Morphett Road, commercial properties (IGA, chemist, takeaway) followed by Graham Crescent Reserve and residential properties.	General Neighbourhood

3.2 Off-site groundwater use

A search of the SA WaterConnect database (October 2024) for registered groundwater wells located within a 2.0 km radius of the site was undertaken as part of this investigation. The results are summarised as follows:

– There were 493 registered wells within a 2.0 km radius.
– Of these registered wells, 15 were installed in 2024 for investigation purposes and 11 in 2023 for different purposes (6 environmental, three investigation, one monitoring and one irrigation).
– In addition, 70 wells were listed as backfilled (BKF), 43 as operational (OPR), 14 as abandoned (ABD), nine as decommissioned (DEC), one as dry, five as controlled (4 flowing (CFL) and 1 shut in (CSH)), five as rehabilitated (RHB), three as unknown (UKN), two as not operational (NOP), two as not in use (NIU) and 339 had no listed status.
– The purpose of the wells is mainly investigation (INV), with 146 registered, 63 for domestic uses (DOM), 49 for monitoring (MON), 16 for observation (OBS), 15 environment (ENV), 11 drainage (DRN) 10 irrigation (IRR), 8 Managed Aquifer Recharge (MAR), two recharge (REC), one recreational (RCL), one industrial (IND) 1 stock (STK). There are 170 wells with no registered purpose.
– TDS data is available for 227 wells within the 2.0 km radius of the site and ranges between 67 mg/L and 22,880 mg/L.
– Five wells registered for domestic purposes are located down the hydraulic gradient of the site to the northwest. The TDS of these wells is between 5900 and 9000 mg/L, making the groundwater unsuitable for drinking or irrigation purposes but potentially suitable for some stock watering or aquaculture purposes.

The SA WaterConnect database search results can be found in Appendix C.

3.3 Off-site surface water use

The nearest natural surface water bodies from the site are the Sturt River, located approximately 0.9 km southwest of the site with reserve land use, and Brown Hill Creek/Willawilla, located at approximately 1.2 km northwest of the site with utility/industry use. Both surface water bodies converge and discharge into the Patawalonga Lake, at approximately 2.2 km northwest of the site, which is used for recreational purposes, and subsequently into the Gulf St Vincent, 2.6 km to the west of the site.

The Patawalonga Lake System, locally known as 'the Pat', is a critical piece of urban infrastructure in managing stormwater and flood risk on the metropolitan coast of Adelaide where several creeks and drains flow into it,

including the Sturt River, Brown Hill Creek, Keswick Creek, Patawalonga Creek, and the Airport drain. Most water is coming from the Sturt and Brown Hill Creek catchments. (DEW, 2024).

The recreational features of the Patawalonga Lake System are mainly boating, fishing, kayaking and other water sports. There is also a circuit path for cyclists and pedestrians. Dolphin sightings are common, and the dolphins often visit the lake to feed (DEW, 2024).

The wetlands associated with the Glenelg Golf Club lie approximately 0.7 km northwest of the site.

The watercourse shown in the Lotsearch report, approximately 0.3 km southwest of the Site (GHD 2023), was identified as a former open stormwater drain that has been backfilled and replaced with underground stormwater pipes.

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4. Assessment criteria

The contaminants of concern in this investigation were limited to PFAS. Assessment criteria from HEPA (2020) PFAS National Environmental Management Plan (Version 2.0), Heads of Environment Protection Authorities Australia and New Zealand, January 2020 (PFAS NEMP) has been adopted.

4.1 Soil

The adopted criteria for the assessment of soil samples are listed in Table 4.1.

Table 4.1 Adopted PFAS Assessment Criteria - Soil

Exposure scenario	PFHxS[1] (mg/kg)	PFOS[2] (mg/kg)	Sum of PFOS and PFHxS (mg/kg)	PFOA[3] (mg/kg)	Reference Document
Human Health Investigation Levels (HIL)					
Site-specific HILs[5] for the screening of PFAS-contaminated soils at SA MFS sites (Metropolitan, Staffed)	-	-	14	50	Derivation of site-specific health investigation levels for urban and metropolitan fire stations (GHD, June 2023)
HIL C – Public open space	1	1	1	10	PFAS NEMP 2.0 (HEPA 2020)
Ecological Screening Levels (ESL)					
Ecological indirect exposure	-	0.14	-	-	PFAS NEMP 2.0 (HEPA 2020)
Ecological direct exposure	-	1	-	10	

Notes:
[1] PFHxS – perfluorohexane sulfonate
[2] PFOS – perfluorooctane sulfonate
[3] PFOA – perfluorooctanoic acid

The assessment of soil analytical results against the *Public open space HIL C* land use criteria covers the most likely exposure pathways given the location of the soil sampling program. The PFAS NEMP 2.0 states that HIL C criteria are relevant for public open spaces such as parks, playgrounds, playing fields (e.g. ovals), secondary schools (except for soil used for agricultural studies) and footpaths. This is consistent with the location where soil samples were collected.

The typical usage patterns at SA MFS fire stations most closely align with the exposure assumptions that underpin HIL D (Industrial/Commercial) values. The following inconsistencies are, however, noted:

– The preliminary site investigations undertaken at SA MFS sites across South Australia have identified that some fire stations have a higher proportion of unsealed ground (up to approximately 75% of the total site area) than has been assumed in the derivation of the HIL D values (up to approximately 20% of the total site area). As a result, there may be greater opportunities for direct access to soil at SA MFS fire stations, including ingesting soil and soil-derived dust.
– The shifts worked by SA MFS firefighters do not align with the assumption of a standard working week that underpins the HIL D values.

Given these factors, Site-specific Health Investigation Levels (SSHILs) have been derived using exposure assumptions that reflect the typical usage pattern of the SA MFS fire stations to allow for a more accurate assessment of the health risks that may be associated with the presence of PFAS in shallow soils (GHD 2023c). Further discussion regarding the development of the SSHILs is provided in the DSI (GHD, 2024)

GHD refers to the ecological direct and indirect–developed sites' exposure scenario criterion within the PFAS NEMP (2020) to assess potential ecological exposure risks. These generic criteria apply to all land use scenarios.

4.2 Water

4.2.1 Environmental values of groundwater

Screening criteria for groundwater are chosen based on environmental values (EVs) outlined in the SA Environment Protection (Water Quality) Policy 2015 (and amendments) (SA EPA 2015) (EPP) and the regulatory requirements for the protection of all water bodies (surface and groundwater) under the Environment Protection Act 1993.

The applicability of environmental values for underground waters is specified in *Schedule 1—Environmental Values of Waters* in the *Environment Protection (Water Quality) Policy 2015*.

For the methodology for determining EVs for the Site and selecting screening criteria, refer to Section 5.2 of the DSI (GHD 2024).

While groundwater TDS indicates a potential for potable use of groundwater, it is considered highly unlikely based on the reticulated water supply of the metro Adelaide region. The drinking water assessment criteria have been included as a conservative measure. The environmental values for the site include:

– Potable use of groundwater (<1,200 mg/L).
– Irrigation and general water use (<3,000 mg/L).
– Livestock drinking water, aquaculture, and human consumption of aquatic foods (<13,000 mg/L).
– Aquatic ecosystem, recreation, and aesthetics (due to proximity to the Sturt River, Glenelg Golf Club wetlands and Patawalonga Creek).

For this investigation, the criteria have been included to:

– Assess the potential risk to people using groundwater for domestic and drinking purposes (i.e. potable use).
– Assess the potential risk to people using groundwater for recreational purposes (i.e., filling of swimming pools).
– Assess the potential risk to users of groundwater for irrigation of edible vegetation.

4.2.2 Environmental values of surface water

The Water Quality Guideline (SA EPA 2016) specifies the protected environmental values of surface water. Results from surface water samples collected during the supplementary investigation have been assessed against the following guidelines, protective of human health and ecological exposure risks in the receiving environment (Brownhill Creek).

4.2.3 Adopted water screening levels

The adopted water screening/investigation levels are summarised in Table 4.2.

Table 4.2 Adopted PFAS Interim Screening Criteria for Groundwater

Exposure Scenario	PFOS[1] (µg/L)	PFHxS[2] (µg/L)	Sum of PFOS and PFHxS (µg/L)	PFOA[3] (µg/L)	Source
Fresh waters 95% Species Protection – Slightly to moderately modified ecosystems	0.13	-	-	220	PFAS NEMP (HEPA 2020)
Fresh waters 99% Species Protection – High conservation value ecosystems	0.00023	-	-	19	
Human Health - Drinking Water	0.07	0.07	0.07	0.56	PFAS NEMP (HEPA 2020) ADWG (NHMRC 2011)
Recreational Waters	2	2	2	10	Guidance on Per and Polyfluoroalkyl (PFAS) in Recreational Water, Canberra: National Health and Medical Research Council (2019)

Notes:
[1] PFOS – perfluorooctane sulfonate
[2] PFHxS – perfluorohexane sulfonate
[3] PFOA – perfluorooctanoic acid

5. Intrusive investigation methodology

5.1 Intrusive off-site drilling program

The intrusive drilling works were completed on the 18th and 19th of September 2024 under the supervision of an experienced GHD environmental scientist. A total of three (3) off-site groundwater monitoring wells (MW04 – MW06) were installed with soil samples (two per location) collected during the drilling works.

A description of the groundwater monitoring well locations is provided in Table 5.1 below. Figure 2 outlines the location of the groundwater monitoring wells at the site.

Table 5.1 Soil Bore Location Rationale

Soil sampling location	Location Rationale
MW04	Located up-hydraulic gradient, approximately 60 m from the Site (Carlisle St).
MW05	Located down-hydraulic gradient (WNW), approximately 130 m from the Site (Irwin Ct).
MW06	Located down-hydraulic gradient (NNW), approximately 65 m from the Site (Graham Cres).

The methodology for the well installation comprised:

– Prior to any intrusive works being undertaken, a review of Before You Dig plans was conducted, and all investigation locations were also cleared for underground service by an accredited service locator (Pipeline Technology Services Pty Ltd) to ensure safe drilling conditions.
– Boreholes were advanced using a hand auger or an Eziprobe drill rig (push-tube drilling technique) operated by WB Drilling Pty Ltd. Where required, concrete coring was undertaken to access the underlying soil media. High-density polyethylene (HDPE) core liners were used to retrieve soil cores to minimise the risk of PFAS cross-contamination.
– Soils recovered from each borehole were logged by an experienced GHD environmental professional to assess the underlying geology and contaminant indicators in accordance with AS 1726:2017.
– 3 m slotted PVC screens (class 18) were installed from the base of the boreholes with solid PVC casing from the top of the screen to the surface. This length was expected to be adequate to account for seasonal groundwater level variations.
– A gravel pack was installed around the screen, extending from the base to approximately 0.5 m above the top of the well screen, with a bentonite plug installed above the sand pack to protect the aquifer from any direct infiltration of surface water into the well screens.
– A lockable gatic cover was installed and concreted in place, flush with the surrounding ground surface.

5.1.1 Opportunistic soil sampling

During the drilling of the monitoring wells, opportunistic soil samples were collected using the below methodology:

– Representative soil samples were collected at regular depth intervals and/or at each new soil horizon for potential laboratory analyses.
– Samples were taken at the surface (0.0-0.2 m bgl) to the termination depth of each monitoring well (2.4-2.9 m bgl) at 0.5 m intervals after that or where lithological changes were observed. Soil samples not analysed were placed on hold.

5.2 Groundwater monitoring well development

Groundwater well development was conducted after well installation on 25 September 2024 and before sampling of the groundwater wells. The goal of well development was to remove as much silt and residual drilling fines as

reasonably practicable so that the water in the well was representative of groundwater. Each well was developed in accordance with the well development procedure outlined below:

– Each well was dipped with an interface probe meter to determine the standing water level (SWL) to metres below the Top of the Casing (m bTOC) and the total depth of the well.
– A stainless steel bailer was used for well development and was deployed within the screen interval.
– Wastewater and silt collected during well development were captured at the surface, and field parameters and other observations were recorded to measure whether water quality parameters had stabilised and the water was therefore expected to be representative of groundwater. Development water was temporarily stored on-site in drums prior to off-site disposal.
– A period of at least one week was generally allowed between development and sampling so that the monitoring well could equilibrate with the surrounding aquifer.

Well development progressed at each monitoring well until a minimum of three bore volumes had been removed, and the measured bottom depth was close to the drilled expected bottom depth, which was as close as reasonably practical. Well development and survey records are provided in Appendix H.

5.3 Groundwater Monitoring Event (GME)

Following the installation of the three (3) off-site groundwater monitoring wells, six (6) groundwater wells (MW01 – MW06) were sampled at the site on 9 October 2024 under the supervision of an experienced GHD environmental scientist.

The groundwater monitoring was undertaken using the low-flow methodology of peristaltic pumping. Peristaltic sampling methods are recommended in the PFAS NEMP for per- and poly-fluoroalkyl substances (PFAS) sampling. This method involved pumping groundwater at a rate that minimised the drawdown of the groundwater table.

Prior to sample collection, the standing water level (SWL) measurements were gauged at monitoring well locations using an oil/water interface probe to determine the depth of groundwater in the wells and the presence or absence of NAPL. Groundwater gauging records are provided in Appendix H.

Samples were collected once field parameters were observed to have stabilised such that the samples were representative of the formation water. Field parameters measured during sampling included:

– pH (± 0.05 pH units).
– Electrical conductivity (± 3%).
– Dissolved oxygen (± 10%).
– Redox potential (± 10 mV).
– Temperature.

The details of well purging, sampling, and field-testing were recorded on groundwater sampling recording forms provided in Appendix H. Additionally, all reusable sampling equipment underwent decontamination, including:

– Washing of equipment with phosphate and PFAS-free cleaning solution.
– Rinsing of equipment with fresh water.
– Rinsing of equipment with laboratory-supplied deionised water.
– Air drying of equipment prior to use.

Detailed discussion of the QA/QC assessment is presented in Section 5.6 and Appendix J.

5.3.1 Total oxidisable precursor assay

The SAQP developed for the supplementary works incorporates the analysis of groundwater samples from two monitoring wells for Total Oxidisable Precursor Assay (TOPA). TOPA aims to detect PFAS precursor compounds through the oxidation of samples and the assessment of consequent regulated PFAS compounds. This may be indicative of the potential emergence of regulated PFAS compounds at a site from existing PFAS precursors as a

result of transformation in the environment from various biotic or abiotic factors. The difference between the amount of PFAS before (i.e., via target analysis) and after the TOPA provides information on the amount of precursors in the sample (Göckener et al. 2022).

5.4 Surface water monitoring event

The surface water monitoring event was undertaken on 25 September 2024 by an experienced GHD environmental scientist. Two (2) surface water samples were taken at the following locations:

– SW01: Stormwater pit directly outside of the station (Albert Avenue).
– SW02: Brownhill Creek stormwater inlet point.

The site is predominantly sealed; therefore, surface water sample locations aim to test the leaching of PFAS from the concrete surface. SW01 is the Site stormwater discharge point for water collected from the concrete apron. SW02 is the discharge point of this stormwater into Brownhill Creek. The co-location of the surface water samples is shown in Figure 2.

As there was minimal rainfall on the surface water sampling date, a simulated rainfall event was created by releasing water from a fire hydrant near the SW01 stormwater pit. The run-off water was then collected from the pit. As a form of quality control, a sample (SW_Hydrant) was collected directly from the fire hydrant as a field-blank sample.

Samples were collected along with field parameters inclusive of:

– pH.
– Electrical conductivity.
– Dissolved oxygen.
– Redox potential.
– Temperature.

5.5 Sampling handling and transport

All samples were collected into sample containers prepared by the analytical laboratory and specific to each analyte. After preparation and labelling, the samples and chain of custody (COC) documentation were stored with ice in a cooler while on-site and in transit.

5.6 Quality Assurance and Quality Control (QA/QC)

During each sampling event (soil, groundwater and surface water), the appropriate QA/QC was undertaken as per the PFAS NEMP. QA/QC samples were collected as part of each sampling program, including intra-laboratory duplicate (split) samples and rinsate blanks.

5.7 Laboratory analysis

Samples collected from each investigation location were submitted to the following laboratories accredited by the National Association of Testing Authorities (NATA) for analysis:

– **Primary:** Australian Laboratory Services Pty Ltd (ALS).
– **Secondary:** Eurofins Environment Testing Australia Pty Ltd (Eurofins).

Soil, groundwater, and surface water samples were submitted for a PFAS full-suite analysis, detailed in the attached laboratory documentation.

6. Results

6.1 Soil

6.1.1 Subsurface conditions

Subsurface conditions encountered during the soil investigation were generally as follows:

– In locations MW03 and MW04, fill material was predominantly encountered at the surface (0.0 - 0.5 m bgl). This material is generally comprised of crushed stone, mulch, and sand. At MW06, grass and silty/clayey sand fill were encountered to the depth of 0.9 m bgl.
– Natural material (primarily sand, clayey sand, sandy clay or clay) was noted at depths of approximately 3.0 m bgl).
– Natural sandy and clayey material was evident at deeper depths, extending to 4 m bgl (borehole termination depth).
– No evidence of staining or any distinguishable olfactory odours was noted during the sampling.

Additional details of the lithological layers observed during the soil sampling program can be found in Appendix E.

6.1.2 Analytical results

The soil analytical testing results are summarised in the analytical results tables attached to this report (Table 1 - Appendix G). The laboratory certificates of analysis are contained in Appendix F. There were no results above the adopted PFAS assessment criteria.

6.2 Groundwater

6.2.1 Well construction details

Screened lithologies, survey information and construction permit information can be found in Table 6.1 below. Reference and information related to encountered lithologies while drilling can be found in Section 6.1.1, and the borelogs are located in Appendix E.

Table 6.1 Well Construction Details

Well ID	Well Construction Permit No.	Installation Date	Installation Depth (m bgl)	Screen Interval (m bgl)	Co-ordinates (GDA20 Z54)		Ground Level (m AHD)	TOC (m AHD)
					Easting	Northing		
MW04	P-503263	18/09/2024	3.5	0.5 - 3.5	275250.802	6127881.125	5.874	5.737
MW05	P-503265	18/09/2024	4.0	1.0 - 4.0	275001.022	6127942.667	5.696	5.602
MW06	P-503264	18/09/2024	4.0	1.0 - 4.0	275111.030	6128000.258	6.030	5.919

6.2.2 Groundwater levels and flow

To understand the groundwater flow direction in relation to the site, on-site and off-site groundwater monitoring wells were gauged before sampling. The groundwater sampling records and the groundwater levels are presented in Appendix H.

Table 6.2 Relative Groundwater Levels (to AHD)

Well ID	Surveyed Top of Casing (TOC) (m AHD)	Surveyed Ground Level (m AHD)	Depth to Groundwater (m bTOC)	Relative Groundwater Level (m AHD)
MW01	5.994	6.061	1.184	4.81
MW02	6.003	6.122	1.218	4.785
MW03	6.411	6.534	1.733	4.678
MW04	5.737	5.874	1.185	4.552
MW05	5.602	5.696	1.643	3.959
MW06	5.919	6.030	1.744	4.175

The groundwater gauging results and survey data were used to prepare a groundwater contour map, as shown in Figure 3 in the attachments. Groundwater was inferred to flow northwest, consistent with the expected regional groundwater flow and local topography. Registered groundwater wells in the vicinity of the site are represented in Figure 6.

6.2.3 Field parameters and observations

No contamination indicators (such as hydrocarbon indicators, chemical odours or sheens) were noted in any of the monitoring wells during the well installation, well development or sampling phases of the investigation.

Groundwater quality parameters were monitored during purging and before sampling. The final values of these parameters before sampling are summarised in Table 6.3.

Table 6.3 Field-measured Groundwater Quality Parameters

Well ID	Date Sampled	Temp (°C)	pH	Dissolved oxygen (mg/L)	Oxidation-reduction potential (mV)		Total dissolved solids (TDS) [1]
MW01	18/09/2024	18.5	7.34	10.3	53.9	8,723	5670
MW02	18/09/2024	19.4	7.02	10	45.5	14,466	9400
MW03	18/09/2024	19	7.08	10	52.9	13,275	8630
MW04	18/09/2024	20	7.49	11	44	4,320	2810
MW05	18/09/2024	19.8	7.14	10.5	55.9	48,142	3130
MW06	18/09/2024	18.7	7.14	10	54.9	8,661	5630

The above field parameters are indicative of the following:

- The shallow groundwater encountered at the site is neutral, with pH between 7.02 and 7.49.
- The groundwater is saline with electrical conductivity values ranging between 4,320 and 48,142 µS/cm.
- Based on the TDS, the applicable environmental values specified in the EP(Water Quality) Policy are:
  - Primary Industries – irrigation and generally water uses (limited circumstances).
  - Primary Industries – livestock drinking water, aquaculture and human consumption of aquatic foods.

6.2.4 Analytical results

A summary of exceedances to the adopted groundwater criteria is tabulated below. For detailed analytical groundwater results, please refer to Appendix G. The laboratory certificates of analysis are contained in Appendix F.

[1] TDS calculated from the EC values. TDS=EC x 0.65

Table 6.4 Summary of Groundwater Exceedances against Adopted Criteria

Location	Approximate Distance from Nearest Site Boundary (metres)	Date	PFHxS (µg/L)	PFOS (µg/L)	PFOA (µg/L)	Sum of PFHxS and PFOS (µg/L)
MW0**1**	on-site	09/10/2024	0.0593	0.178	0.0024	0.237
MW0**2**	on-site	09/10/2024	0.0040	0.0071	<0.0005	0.0111
MW03	on-site	09/10/2024	0.325	0.0439	0.0118	0.369
MW0**4**	60 (east)	09/10/2024	0.0043	0.0012	0.0019	0.0055
MW0**5**	130 (WNW)	09/10/2024	0.0019	0.0017	<0.0005	0.0036
MW0**6**	65 (NNW)	09/10/2024	0.0065	0.0020	<0.0005	0.0085

Notes:
Dark aqua depicts an exceedance of the 95% species protection default ecosystem protection guideline values.
Light aqua depicts an exceedance of the 99% species protection default ecosystem protection guideline values.
Yellow depicts an exceedance of the Human Health - Drinking Water guideline values.

Exceedances of the Drinking Water guidelines were observed in MW03 and MW01. All wells, including the newly installed monitoring wells (MW04 – MW06), exceeded the 99% species protection default guideline values. Groundwater exceedances of the adopted criteria are depicted in Figure 4.

6.2.5 TOPA groundwater results

Results from the TOPA are summarised in Table 6.5. The full complement of TOPA results is contained in Appendix G.

Table 6.5 TOPA results

ID	PFHxS (µg/L)			PFOS (µg/L)			PFOA (µg/L)			Sum of PFHxS and PFOS (µg/L)		
	Std	TOPA	% Diff	Std	TOPA	% Diff	Std	TOPA	% Diff	Std	TOPA	% Diff
MW01	0.059	0.066	10.2	0.178	0.153	-16.3	0.0024	0.003	20.0	0.237	0.219	-8.2
MW06	0.007	0.01	35.0	0.0020	<0.002	-	<0.0005	<0.002	-	0.009	0.01	15.0

Except for PFOS and the sum of PFHxS and PFOS, TOPA's results predominantly exceeded those obtained from the standard PFAS analyses. The largest percentage difference in results between the two analytical methods is observed in MW06. Low and variable recoveries may also lead to false negatives (Chiang 2019). The TOPA results indicate the presence of precursors in groundwater that may oxidise under certain biotic or abiotic conditions into perfluoroalkyl acids (PFAA). However, these results suggest the worst-case scenario, as complete transformation may not occur under natural conditions (Chiang 2019).

6.3 Surface water

6.3.1 Field parameters and observations

Surface water quality parameters are summarised in Table 6.6 below. A complete set of field sheets can be found in Appendix H.

Table 6.6 Field-measured surface water Quality Parameters

Location	Date Sampled	Temp (°C)	pH	Dissolved oxygen (mg/L)	Oxidation-reduction potential (mV)	Electrical conductivity (µS/cm)
SW01	25/09/2024	17.2	7.63	8.77	-61.7	728
SW02	25/09/2024	17.1	6.89	7.39	-58.8	923

6.3.2 Analytical results

Table 6.7 provides a summary of the surface water exceedances of the adopted assessment criteria. Surface water analytical results are provided in Appendix G.

Table 6.7 Results above Adopted PFAS Assessment Criteria

Location	Date	PFHxS (µg/L)	PFOS (µg/L)	PFOA (µg/L)	Sum of PFHxS and PFOS (µg/L)
SW01	25/09/2024	<0.01	<0.01	<0.01	<0.01
SW02	25/09/2024	0.02	0.02	<0.01	0.04
SW HYDRANT	25/09/2024	<0.01	<0.01	<0.01	<0.01

Notes:
Light aqua depicts an exceedance of the 99% species protection default guideline values.

The concentrations of PFOS in samples assessed were reported either below the laboratory reporting limits or below the adopted ecological and health assessment criteria except for SW02, where the PFOS present an exceedance for the freshwater - 99% - high conservation value systems assessment criteria (0.00023 µg/L). Surface water exceedances of the adopted criteria are depicted in Figure 5.

7. Quality Assurance and Quality Control

A comprehensive QA/QC assessment was completed for all analytical sample data to evaluate the data's suitability on which to base the investigation. This included collecting and reviewing results obtained from duplicates, field blanks and rinsate blank samples.

The QA/QC assessment found that the majority of Data Quality Indicators (DQIs) were within the specified tolerance levels. A small proportion of RPD exceedances were reported for some PFAS soil analytes; however, RPD exceedances are likely due to the heterogeneity of soils in the area. Additionally, given the relatively low-level concentrations detected for PFAS compounds, the likelihood of elevated RPD values is increased. Given that all other RPD values are within the acceptable range, GHD considers the data set to be of acceptable quality on which to base this assessment. The majority of RPDs were calculated within acceptable limits, except for some PFAS analytes in the duplicate sample. With the majority of results being within the same order of magnitude and the relatively minor concentrations reported for the majority of elevated RPDs, GHD considers the data set to be of an acceptable quality on which to base the assessment. The QA/QC assessment is provided in Appendix J.

8. Conceptual site model

Fundamental to any contamination investigation is the development of a Conceptual Site Model (CSM), which is a description of the plausible mechanisms ('pathway') by which people and ecology ('receptors') may be exposed to chemicals in the environment ('sources'). Potential risks to human health or the environment cannot occur without a complete Source-Pathway-Receptor (SPR) linkage. Conversely, complete SPR linkages do not, by default, indicate risk and the site investigation process is used to evaluate the extent of potential risks.

The CSM provided in this report has been updated from the previous GHD 2024 DSI report version. Information regarding on-site sources, pathways and receptors has been included for completeness. Please refer to the DSI report (GHD 2024) for information on these. Graphical representations of the CSM can be found in Figure 7 and Figure 8.

8.1 Potential source-pathway-receptor linkages

Based on the potential SPR linkages identified in this investigation and information obtained from previous studies (PSI and DSI), a CSM has been developed for the site, with an assessment of exposure risk summarised in Table 8.1.

SPR linkages were assessed under the following categories:

– Unknown – Not enough data available to indicate if a linkage is present or absent.
– Possible – Data indicates PFAS impacts or a potential source has been identified, and receptors are present; however, the source extent of PFAS impacts and/or pathways to a receptor are not understood.
– Likely – PFAS impact has been confirmed, and pathways to receptors are likely to present; however, the extent of the connection has not been confirmed or is not fully understood.
– Confirmed – PFAS impact greater than the adopted assessment criteria is present at the receptor; hence, SPR linkage has been confirmed.
– Unlikely – Source and/or pathways have not been identified or have been identified below the assessment criteria protective of the receptor; hence, SPR linkage is unlikely to be complete.

SPR linkages classified as 'unknown', 'possible' or 'likely' warrant further investigation.

Table 8.1 CSM for PFAS exposure - SPR linkage assessment option

Source	Potential Receptors	Exposure Pathways	Risk from exposure through SPR Linkages
On-site PFAS-impacted soils.	Site users, visitors, maintenance, and construction workers	Direct dermal contact with contaminated soil	**Unlikely** Concentrations reported from on-site samples were below the adopted HIL B for residential minimal accessible soil land use and the site-specific guidelines.
		Incidental ingestion of contaminated soil	
		Inhalation of contaminated soil or dust from disturbed soils	
	Terrestrial ecosystems at and immediately surrounding the site	Direct contact with contaminated soil	**Unlikely** Historical PFAS concentrations detected in surface samples (GHD, 2019) on-site have exceeded the adopted Tier 1 ecological criteria for indirect exposure. The unsealed areas of the site and trees are accessible to flora and fauna; however, considering the highly urbanised environment and the limited garden areas, it is unlikely to impact a high-value ecosystem, particularly via the secondary exposure pathway. PFAS concentrations detected in sub-surface soil samples that have exceeded the adopted Tier 1 ecological criteria for indirect exposure are located beneath sealed areas of the site, 0.4 m below the surface. Direct contact exposure with soils is therefore considered to be unlikely. As such, higher trophic species would likely not directly come into contact with this soil, and the opportunity to consume PFAS through the food chain is limited while the soils remain undisturbed.
		Ingestion of contaminated soil	
		Bioaccumulation through indirect contact	
	Groundwater beneath the site	Rainwater/surface run-off leaching impacted soil followed by migration through porous media into groundwater.	**Confirmed** PFAS concentrations have been detected in all six groundwater monitoring wells installed, including three on-site.
		Historical soaking of flushing wastewater into the ground.	
		Storage of impacted water in subsurface tanks and leaking to groundwater	
On-site PFAS impacted concrete and bitumen surfaces	Site users, visitors, maintenance, and construction workers	Direct dermal contact with contaminated soil	**Unlikely** Concrete and bitumen surfaces on-site that have historically been exposed to PFAS containing AFFF have been sampled and confirmed the presence of PFAS compounds; however, these are below the adopted exceedance criteria. It is considered unlikely that site users, visitors, maintenance, or construction workers would be exposed to PFAS quantities detrimental to their health via this exposure pathway due to the limited opportunity for exposure to occur in a solid material
		Inhalation of contaminated dust	

Source	Potential Receptors	Exposure Pathways	Risk from exposure through SPR Linkages
			(generally leaching only). Although this pathway is unlikely, there is still the potential for this to become a completed pathway.
	Surface and stormwater	Surface run-off into site stormwater system	**Unlikely** Concrete and bitumen media are known to leach PFAS compounds into surface water. Stormwater from the Site is ultimately discharged to surface water bodies. Testing was undertaken on-site at the stormwater discharge point. In the absence of rainfall during sampling, the site was hosed down from a fire hydrant, and the water was tested as it was discharged into the stormwater drain. PFAS was not detected in this sample. Concentrations were identified as downgradient at SW02 and exceeded the ecological criteria; however, these are considered likely to be background concentrations, given known sources of contamination within the area. Concentrations within sample SW01 were also reported below LOR, with the probability of this being a completed SPR linkage unlikely.
	Groundwater beneath the Site	Direct contact with contaminated groundwater Ingestion of contaminated groundwater Bioaccumulation through indirect contact	**Possible** Concrete and bitumen surfaces that have historically been exposed to PFAS containing AFFF have been sampled, and the presence of PFAS compounds has been confirmed. PFAS concentrations have been detected in all three groundwater monitoring wells installed on-site as part of this investigation with exceedances above adopted PFAS NEMP Freshwater 99% criteria and human health drinking water criteria. Leaching from the concrete may be an ongoing source of groundwater contamination. Concrete has a high pH, which typically results in greater PFAS mobility. However, the contribution of concrete leaching to the elevated levels of PFAS detected in groundwater is unknown, compared to migration from surface water or desorption of soils. PFAS was not detected in water from a hydrant that had been in contact with the concrete. However, it is noted that the contact time was low, and therefore, there was limited opportunity for leaching to occur.
PFAS impacted groundwater	People using groundwater for domestic and drinking purposes	Consumption of contaminated groundwater	**Unlikely** All wells tested on and near the site, including all wells located down-gradient of the site, have a natural background salinity that is at least double, and mostly much higher, than the salinity where drinking water uses are applicable. PFAS concentrations detected in off-site monitoring wells are below the human health drinking water criteria. The area surrounding the site has a reticulated water supply and is, therefore, unlikely to be used for drinking.

Source	Potential Receptors	Exposure Pathways	Risk from exposure through SPR Linkages
	People using groundwater for irrigation of vegetable gardens and/or fruit trees with which they grow produce for consumption.	Consumption of fruit and vegetables irrigated by contaminated groundwater	**Unlikely** Ten registered wells within a 2.0 km radius of the site had irrigation purposes. However, the natural background salinity of the water in the vicinity of the site, including all bores down gradient, means that the water is not suitable for this use. PFAS concentrations detected in wells off-site were very low; therefore, any uptake of PFAS into such crops would be low. Monitoring off-site groundwater wells did not find evidence that contamination had migrated off-site.
	People growing edible vegetation in open soil which may interact with groundwater	Consumption of PFAS impacted edible vegetation	**Unlikely** The inferred groundwater flow direction is to the northwest, into a residential area. Annual vegetable crops are unlikely to have roots extending to the groundwater's depth at >1m deep. Perennial plants such as fruit trees could uptake PFAS from groundwater. A groundwater bore close to the nearest residential property downgradient to the site detected low levels of PFAS; however, these were below drinking water guidelines and fruit trees are considered less likely to update and accumulate PFAS (NSW EPA, 2019) A review of aerial photography suggests that limited properties in producing foods for consumption exist downgradient from the site.
	People using groundwater for recreational purposes, such as filling swimming pools	Incidental ingestion of contaminated groundwater	**Unlikely** PFAS concentrations detected on and off-site do not exceed the PFAS recreational guidelines. The PFAS concentrations detected off-site are much lower (approximately two orders of magnitude lower) than those detected on-site.
	On-site and down gradient off-site maintenance and sub-surface construction workers that contact PFAS-contaminated groundwater	Direct dermal contact or incidental ingestion of contaminated groundwater	**Unlikely** Whilst it is possible that off-site maintenance or sub-surface construction workers could come into contact with contaminated groundwater, it is very unlikely it would be ingested. Dermal contact is a potential pathway, given the expected shallow groundwater depth at the site. However, the low concentrations detected off-site and the limited exposure time will unlikely impact off-site maintenance workers.
	The freshwater ecosystems of Sturt River, Brown Hill Creek/ Willawilla and Patawalonga River	Discharge of contaminated groundwater to surface water	**Unlikely** Surface water bodies lie within the 2km radius of the site, where conservation and recreational uses are identified. The interaction of surface water with the groundwater beneath it is possible. Surface water sample results for the SW02 (Brownhill Creek stormwater inlet point) were above the freshwater 99% criteria. However, other sources are likely to be entering the creek. The mass flux discharge rate of contaminated groundwater into the surface water is expected to be low compared to the surface water flow rate. Groundwater off-site

Source	Potential Receptors	Exposure Pathways	Risk from exposure through SPR Linkages
			results were similar to those of up-gradient background results, indicating that the site has a limited impact on groundwater PFAS concentrations. However, concentrations at SW02 are likely background concentrations, with several known contaminant sources identified as entering the inlet.
	Recreational users of Sturt River, Brown Hill Creek/ Willawilla and Patawalonga River	Direct contact and/or ingestion with contaminated groundwater.	**Unlikely** All groundwater monitoring results, on-and off-site, were below the recreational criteria. Groundwater will be diluted on discharge to surface water.

9. Discussion

9.1 PFAS soil impacts

During the previous DSI (GHD, 2024), PFOS concentrations were identified above the adopted assessment criteria for indirect ecological exposure for developed sites (0.14 mg/kg) in two collected soil samples. All exceedances for ecological criteria occurred beneath the sealed concrete apron to the south of the washdown/flushing area, near the site's drainage system. Soil samples collected during the advancement of off-site monitoring wells reported concentrations below the adopted ecological guidelines.

For on-site and off-site, the lateral extent of PFAS impacts has been delineated to the north and west for the adopted assessment criteria for current site use. No soil samples exceeded the Tier 1 human health assessment criteria.

Although soil impacts have not been delineated to the south and in the southeastern corner of the site, it is unlikely to extend off-site in these directions as industrial businesses with fully sealed surfaces are located directly to the south and east of the site. Also, due to the extensively sealed surfaces surrounding the site to the north and west, in the form of roads and commercial development, with only minor garden/grassed areas, potential soil impacts and/or exposure pathways external to the site are considered negligible.

9.2 PFAS groundwater impacts

Concentrations above the ADWG recommendations for human health drinking water were reported in two of the on-site monitoring wells for the Sum of PFHxS and PFOS, with exceedance values ranging from 0.237 µg/L (MW01) and 0.369 µg/L (MW03) compared to the adopted criteria of 0.07 µg/L (ADWG). This is consistent with the findings from the previous DSI, where the concentrations were above the criteria for all the wells (exceedance values ranging from 0.09 µg/L (MW02) to 0.68 µg/L (MW03)). Concentration exceedance of 0.325 µg/L for PFHxS was also found in MW03. However, all wells near the site and down gradient had natural background salinities well above the levels for water suitable for drinking. No concentrations exceeding the adopted human health drinking water criteria were identified in the off-site wells.

PFOS concentrations above the PFAS NEMP Freshwater - 95% for slightly to moderately disturbed systems were also reported with an exceedance value of 0.178 µg/L (MW01) on-site (previous DSI presented exceedances in all three monitoring wells ranging from 0.04 - 0.06 µg/L). In comparison, the 99% species protection PFOS exceedances were found from MW02 to MW06, with the highest concentration of 0.0439 µg/L in MW3.

Two off-site monitoring wells presented lower concentrations, ranging from 0.0012 µg/L to 0.020 µg/L in MW04 (up-gradient) and MW06 (down-gradient), respectively.

Concentrations in MW04 may represent potential off-site sources contributing to elevated background levels within the vicinity of the site.

These results demonstrate the low potential for significant off-site migration of PFAS contamination in groundwater, with the concentration decreasing significantly as the distance from the site increases.

There were no exceedances for any of the criteria for PFOA for any of the wells; however, low concentrations were found in MW01, MW03 and MW04.

MW03 presented a relatively high concentration of PFHxS (from previous DSI and this investigation) compared to the other locations. MW03 is located on the northwest corner of the site, in the inferred direction of groundwater flow (down-gradient from the appliance washdown/flushing area and associated site drainage), and PFAS contamination was confirmed to extend off-site to the northwest (MW05 and MW06). The plume likely continues extending in that direction; however, no identified linkages to potential human health or ecological receptors were identified downgradient from the site.

Total Oxidisable Precursor Assays were undertaken for one on-site (MW01) and one off-site (MW06) monitoring wells, showing the largest percentage difference in results between the TOPA and the standard PFAS analysis in MW06. The TOPA results indicate the potential for PFAS precursors to break down, forming smaller, more commonly tested PFAS compounds.

Given the high number of registered wells within 2 km of the site with no recorded purpose, using a certain number of these wells for recreational purposes, such as filling swimming pools, cannot be discounted. The recreational criteria were not exceeded in on-site or off-site wells.

9.3 PFAS surface water impacts

The nearest surface water bodies from the site are the Sturt River and Brown Hill Creek/Willawilla. Both surface water bodies converge and discharge into the Patawalonga Lake, approximately 2.2 km northwest of the site and adjacent to the Adelaide Airport. The wetlands associated with the Glenelg Golf Club are also approximately 0.7 km northwest of the site. Ecological protection and recreational uses are relevant at these water bodies.

The most sensitive environmental values to be applied to the Site are PFAS NEMP 2020 Recreational Water criteria for human health, while the most sensitive environmental value for ecological receptors is the 99% freshwater ecological guidelines.

Two samples were taken to understand the PFAS impacts migrating off-site via surface water. As there was minimal rainfall on the surface water sampling date, a simulated rainfall event was created by releasing water from a fire hydrant near the SW01 stormwater pit. The run-off water was then collected from the pit. The surface water sample result for SW02 (Brownhill Creek stormwater inlet point) was above the freshwater 99% criteria. In contrast, the concentrations at the on-site stormwater discharge point, SW01, did not show any detection of PFAS.

The PFAS impacts identified at SW02 are likely due to other upgradient sources and the adjacent Adelaide Airport, a known source of PFAS contamination to the surrounding environment.

10. Conclusions and recommendations

The following conclusions were drawn based on the findings of the investigation:

– The lithologies that were encountered beneath the site are consistent with the Pooraka Formation, with sand, sandy clay and clay identified below the fill material
– Shallow groundwater was encountered between 1.1 - 1.7 m bgl
– Off-site registered wells close to and down-gradient of the site have natural background salinities in the water that are unsuitable for drinking water and irrigation purposes. While groundwater could be used for recreational purposes such as filling swimming pools, the groundwater monitoring results on- and off-site did not exceed the PFAS recreational water use criteria.
– PFAS concentrations identified in groundwater upgradient from the site were of a similar order of magnitude to those identified downgradient from the site.
– Simulated surface water discharge from the site to stormwater identified no impacts from PFAS.
– PFAS impacts on downgradient surface water environments are likely due to other sources not associated with the MFS Camden Park Site.

Recommendations

The recommendations are as follows:

– If required by future development/activities at the site, a PFAS management plan should be developed to address handling PFAS-impacted materials.

11. References

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SA EPA 2019b, Guidelines for Regulatory Monitoring and Testing – Groundwater Sampling, Environment Protection Authority, South Australia, 2019.

Figures

Data Disclaimer

Paper Size ISO A3

0 5 10 15 20

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

N

GHD

South Australian Metropolitan Fire Service
Camden Park Fire Station
Further Contamination Investigation

Site Location Plan

Project No. **12645793**
Revision No. **C**
Date **17/12/2024**

FIGURE 1

\\ghdnet\ghd\AU\Adelaide\Projects\33\12645793\GIS\Maps\Deliverables\12645793_CamdenParkFigures\12645793_CamdenParkFigures.aprx - 12645793_001_SiteLocationPlan_revA
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Nearmap WMS Server: Imagery (Datex Extracted: 19/11/2024). Created by: aulayao

Paper Size ISO A3

0 5 10 15 20

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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GHD

South Australian Metropolitan Fire Service
Camden Park Fire Station
Further Contamination Investigation

Groundwater and Surface Water Monitoring Location Plan

Project No. **12645793**
Revision No. **B**
Date **17/12/2024**

FIGURE 2

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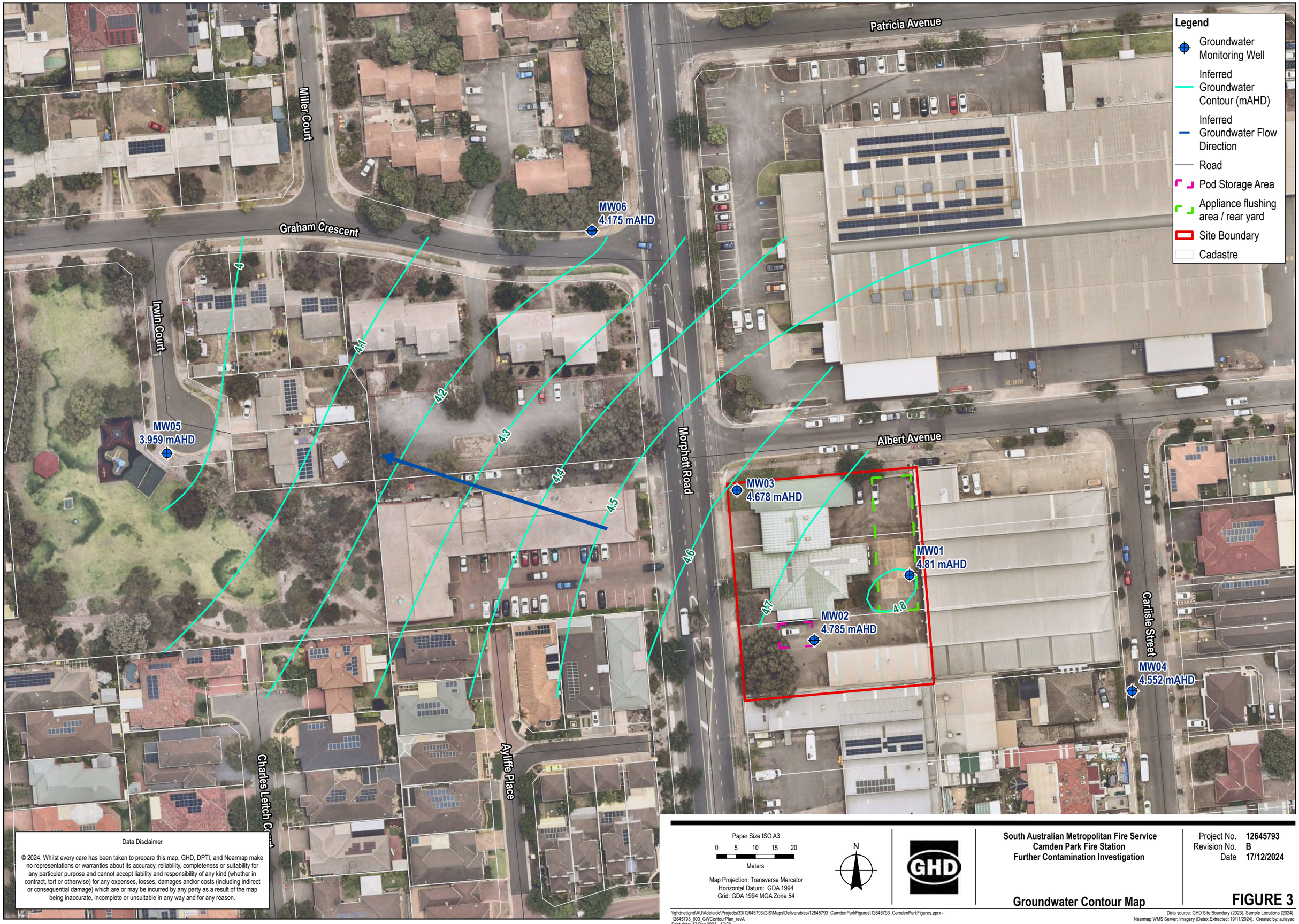

Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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GHD

South Australian Metropolitan Fire Service
Camden Park Fire Station
Further Contamination Investigation

Groundwater Contour Map

Project No. **12645793**
Revision No. **B**
Date **17/12/2024**

FIGURE 3

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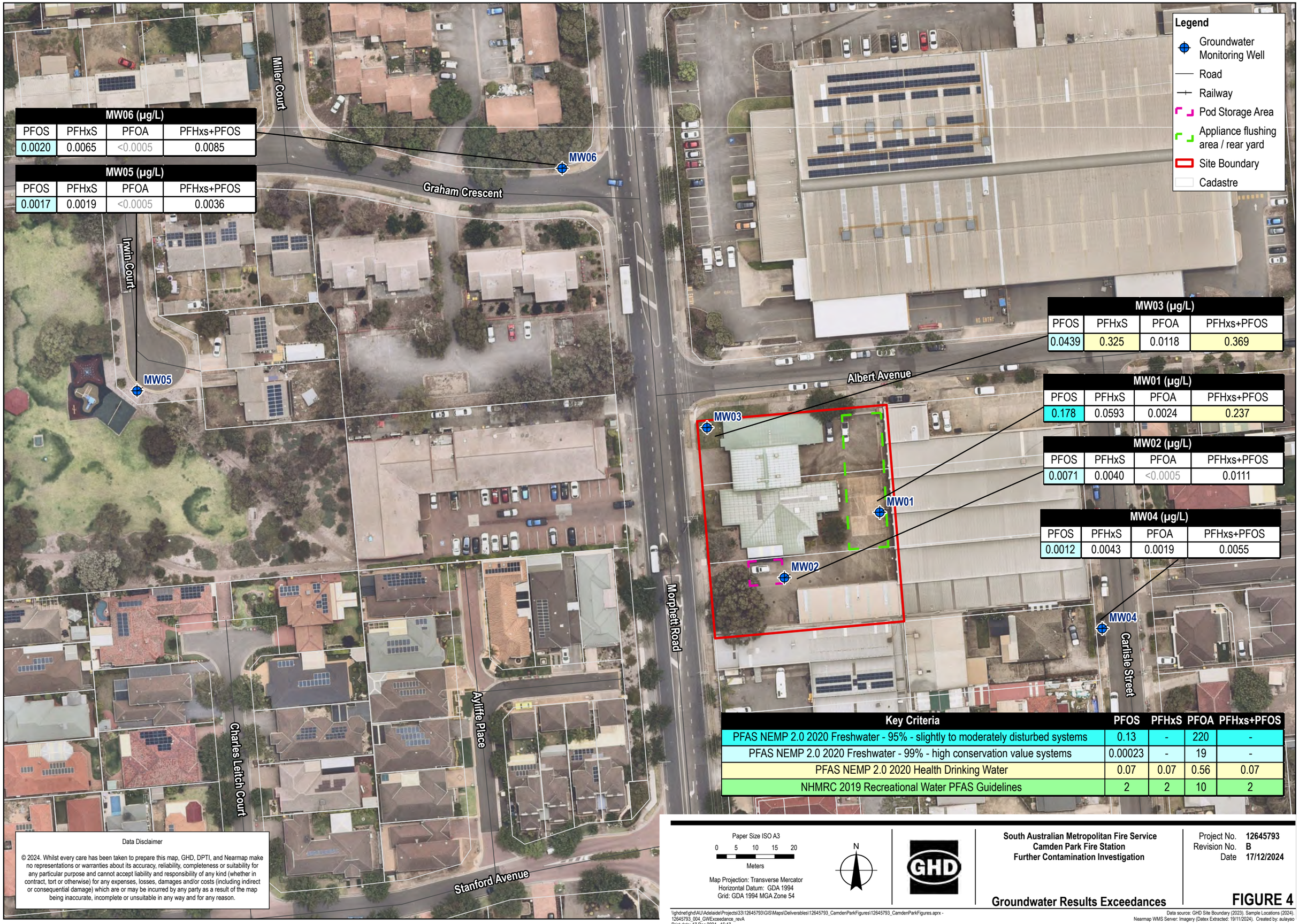

MW06 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
0.0020	0.0065	<0.0005	0.0085

MW05 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
0.0017	0.0019	<0.0005	0.0036

MW03 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
0.0439	0.325	0.0118	0.369

MW01 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
0.178	0.0593	0.0024	0.237

MW02 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
0.0071	0.0040	<0.0005	0.0111

MW04 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
0.0012	0.0043	0.0019	0.0055

Key Criteria	PFOS	PFHxS	PFOA	PFHxs+PFOS
PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems	0.13	-	220	-
PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems	0.00023	-	19	-
PFAS NEMP 2.0 2020 Health Drinking Water	0.07	0.07	0.56	0.07
NHMRC 2019 Recreational Water PFAS Guidelines	2	2	10	2

Paper Size ISO A3

0 5 10 15 20

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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GHD

South Australian Metropolitan Fire Service
Camden Park Fire Station
Further Contamination Investigation

Groundwater Results Exceedances

Project No. **12645793**
Revision No. **B**
Date **17/12/2024**

FIGURE 4

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Data source: GHD Site Boundary (2023). Sample Locations (2024). Nearmap WMS Server: Imagery (Datex Extracted: 19/11/2024). Created by: aulayao

Key Criteria	PFOS	PFHxS	PFOA	PFHxs+PFOS
PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems	0.13	-	220	-
PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems	0.00023	-	19	-
PFAS NEMP 2.0 2020 Health Drinking Water	0.07	0.07	0.56	0.07
NHMRC 2019 Recreational Water PFAS Guidelines	2	2	10	2

Legend

- Surface Water Sample
- Road
- Railway
- Pod Storage Area
- Appliance flushing area / rear yard
- Site Boundary
- Cadastre

Albert Avenue

SW01

SW_Hydrant

SW01 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
<0.01	<0.01	<0.01	<0.01

SW_HYDRANT (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
<0.01	<0.01	<0.01	<0.01

SW02 (µg/L)			
PFOS	PFHxS	PFOA	PFHxs+PFOS
0.02	0.02	<0.01	0.04

SW02

Approximately 1.5km upstream

Morphett Road

Carlisle St

Ayliffe Place

Stanford Avenue

Paper Size ISO A3

0 5 10 15 20

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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GHD

South Australian Metropolitan Fire Service
Camden Park Fire Station
Further Contamination Investigation

Project No. 12645793
Revision No. B
Date 17/12/2024

Surface Water Results Exceedances

FIGURE 5

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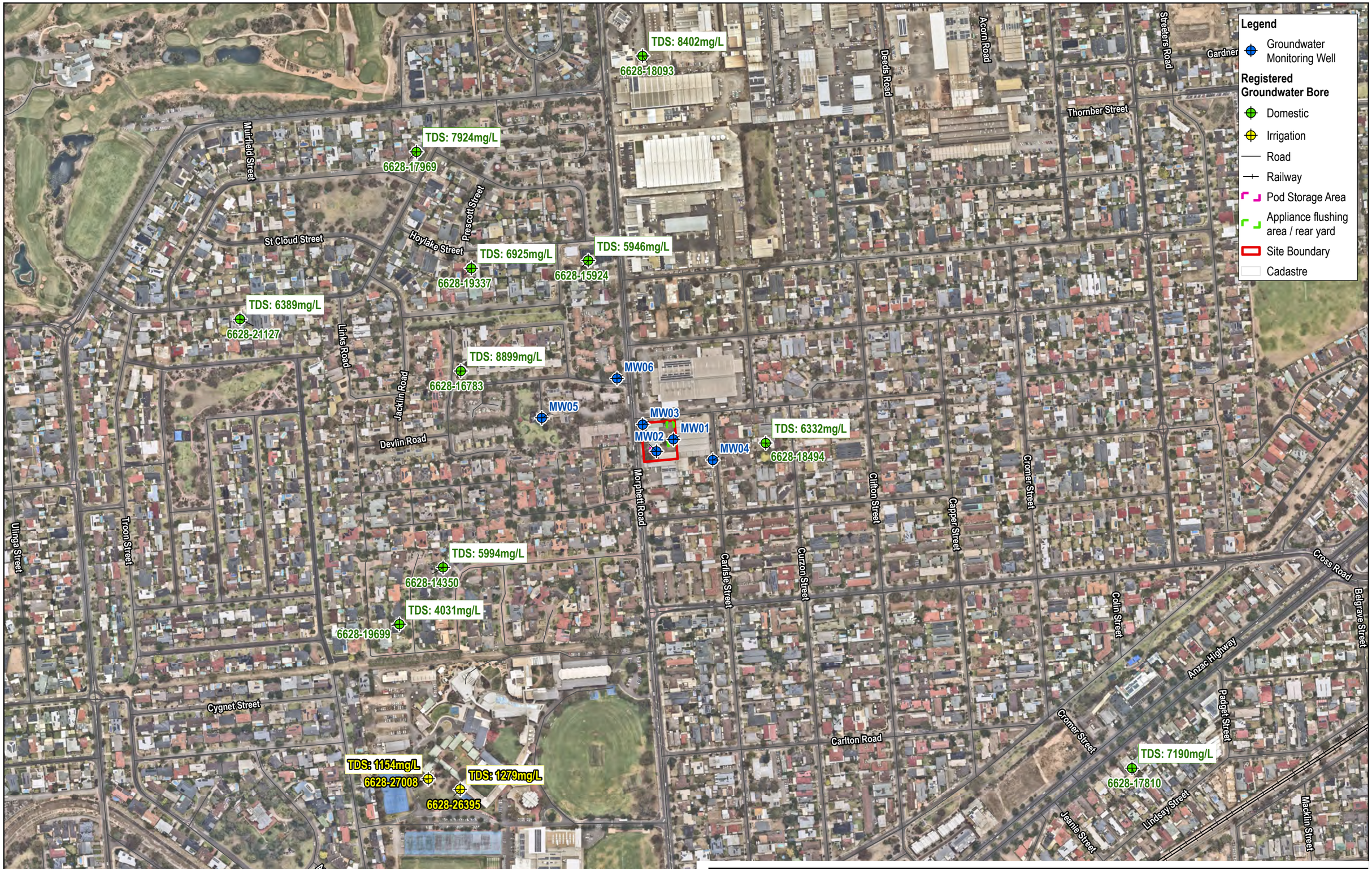

Data Disclaimer

Paper Size ISO A3

0 50 100 150 200

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

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GHD

South Australian Metropolitan Fire Service
Camden Park Fire Station
Further Contamination Investigation

Project No. **12645793**
Revision No. **B**
Date **17/12/2024**

Groundwater Bore Search Plan

FIGURE 6

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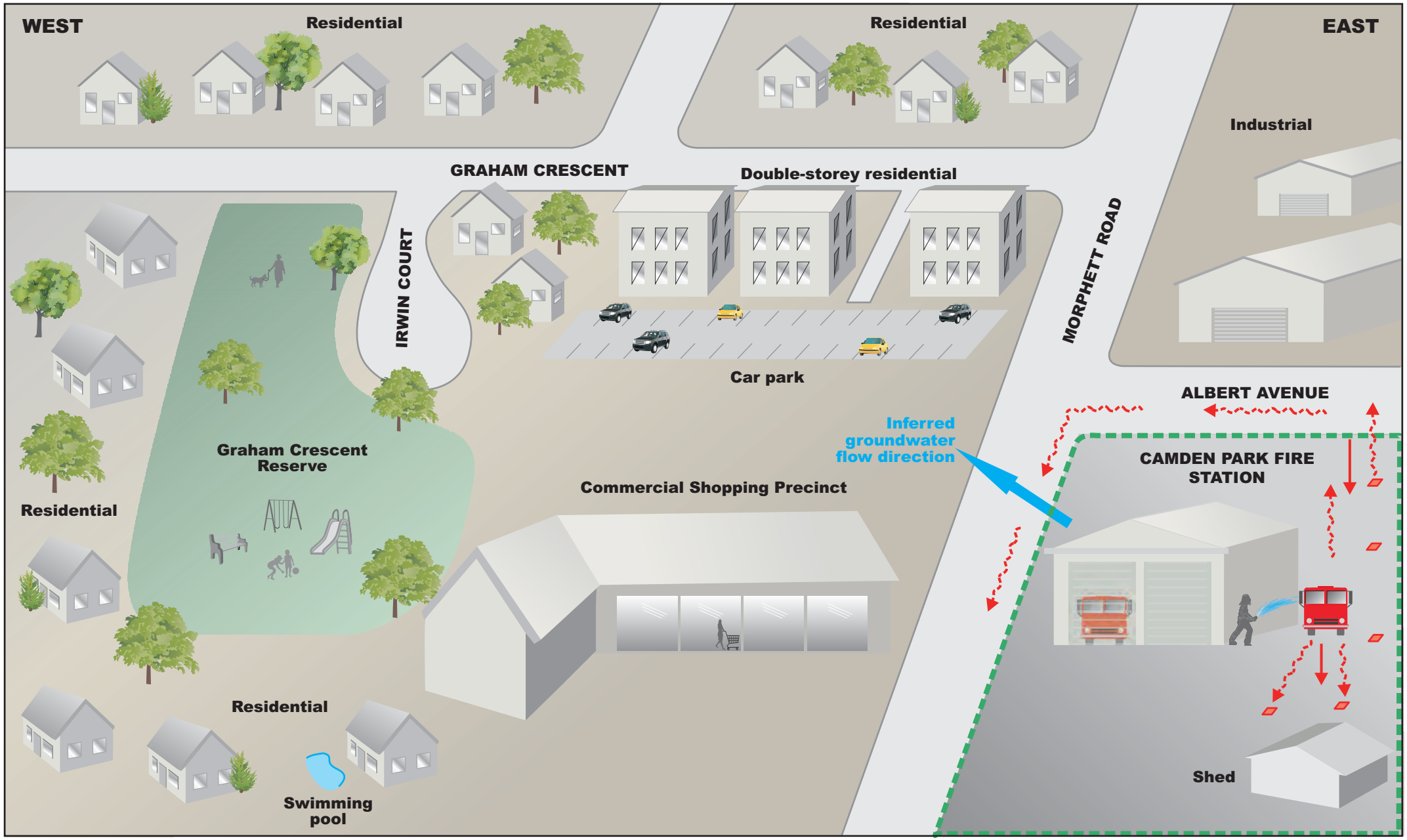


LEGEND

- Site boundary
- Stormwater drain
- PFAS migrating vertically to groundwater
- Discharge of PFAS and AFFF to stormwater

Conceptual diagram only - scale is approximate

SA MFS
Camden Park **Supplementary** DSI
65 Morphett Road, Camden Park, SA 5038

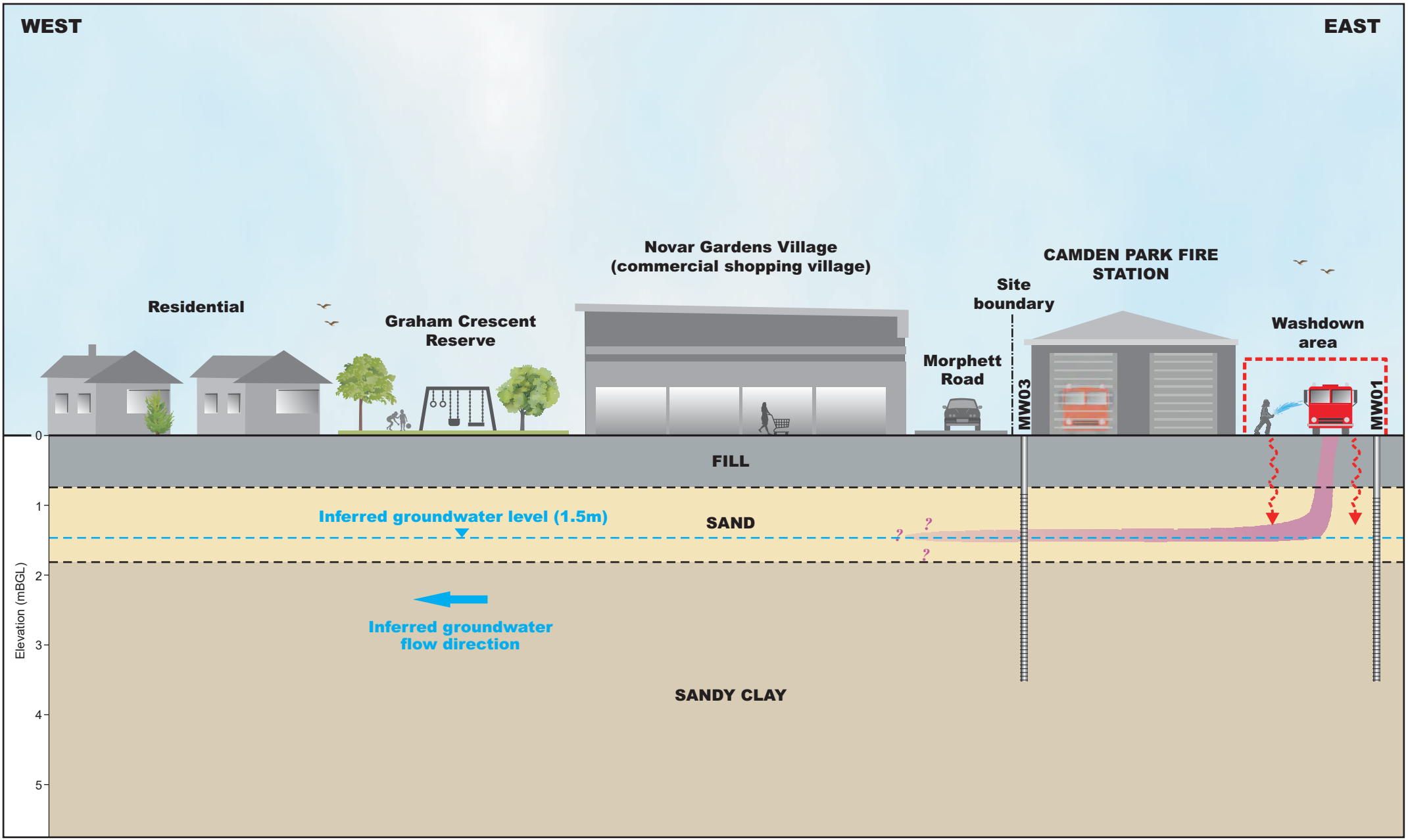
Conceptual site model

Project No. 12645793
Revision No. A
Date 16/11/2023

FIGURE 7

AU\Launceston\Projects\Admin\Graphics\12\616802\12616802_LST_01.cdr

Level 4, 211 Victoria Square Adelaide SA 5000 T 61 8 8111 6600 F 61 8 8111 6699 E ademail@ghd.com W www.ghd.com



LEGEND

PFAS infiltration

Inferred PFAS

Conceptual diagram only - scale is approximate

SA MFS
Camden Park **Supplementary** DSI
65 Morphett Road, Camden Park, SA 5038

Conceptual site model cross section

Project No. 12645793
Revision No. A
Date 18/12/2023

FIGURE 8

AU\Launceston\Projects\Admin\Graphics\12\616808\12616808_LST_01.cdr

Level 4, 211 Victoria Square Adelaide SA 5000 T 61 8 8111 6600 F 61 8 8111 6699 E ademail@ghd.com W www.ghd.com

Appendices

Appendix A

SA EPA Letter

Environment Protection Authority
GPO Box 2607 Adelaide SA 5001
T (08) 8204 2004
Country areas 1800 623 445

EPA GENI 63256

Ms Krystle Mitchell
Senior Scientific and Environmental Officer
South Australian Metropolitan Fire Service
By email: Krystle.Mitchell@eso.sa.gov.au

Dear Ms Mitchell,

RE: REVIEW OF SITE CONTAMINATION REPORT – ACTION REQUIRED

Site: Camden Park Fire Station, 65-69 Morphett Road, Camden Park SA 5038 (CT 5413/751)

Thank you for providing the Environment Protection Authority (EPA) with a copy of the following report:

- *MFS Camden Park Station Detailed Site Investigation, South Australian Metropolitan Fire Service*, prepared by GHD and dated 20 February 2024.

Details of this report have been recorded in the EPA Public Register[1]. This information will be made available to interested parties upon written enquiry to the Public Register Administrator of the EPA and will be included in the Public Register Index on the EPA website (http://www.epa.sa.gov.au). The information will also be available to all prospective purchasers of the site in the Form 1 of the Regulations under the *Land and Business (Sale and Conveyancing) Act 1994* (refer to the 'Particulars Relating To Environment Protection'), and through Section 7 statements.

Based on the information included in the report the site has been deemed to be a Level 1 regulatory priority in accordance with the EPA Site Contamination Regulatory Framework[2]. This priority level assists the EPA in selecting the appropriate regulatory approach and reporting timeframe to ensure that site contamination is managed effectively.

The EPA supports the recommendations for further assessment as documented in the DSI report.

In addition to the DSI recommendations, further assessment is recommended to include:

- Investigations to determine whether surface water migrating from the site is impacting receiving waters and presenting a risk to ecological receptors.
- Development of a community engagement plan, if offsite investigations are planned.

Please provide the EPA with a report documenting the above investigations by **31 December 2024**.

Please provide a copy of this letter to your engaged consultant to assist them in developing a scope of works for the site.

The EPA advises that stormwater and wastewater management at MFS sites may benefit from a review to ensure that activities undertaken at the site (including the wash down of vehicles) complies with the general environmental duty[3]. Onsite stormwater management may also assist in preventing the potential migration of PFAS from MFS sites to stormwater and ultimately to sensitive receiving environments during rain events.

[1] In accordance with section 109(3)(i) of the *Environment Protection Act 1993*
[2] https://www.epa.sa.gov.au/files/15469_sc_regulatory_framework.pdf
[3] Section 25 of the Act

Fact sheets relating to your obligations under the *Environment Protection Act 1993* and how to engage a site contamination consultant be found at www.epa.sa.gov.au.

If you would like further assistance on this or any other matter, please contact Mollie Owens on (08) 8204 8525 or at mollie.owens@sa.gov.au.

Yours sincerely

Hustance

Hannah Custance

PRINCIPAL ADVISER, SITE CONTAMINATION

ENVIRONMENT PROTECTION AUTHORITY

Date: 3 June 2024

cc: GHD Pty Ltd (by email: ben.petticrew@ghd.com & thomas.duncan@ghd.com)

cc: Ruby Jones, MFS (by email: ruby.jones@eso.sa.gov.au)

Appendix B

Well-Permits

Civic Centre
165 Sir Donald Bradman Drive
Hilton, SA 5033
Tel: 08 8416 6333
Email: csu@wtcc.sa.gov.au
Web: westtorrens.sa.gov.au

City of West Torrens
Between the City and the Sea

28 August 2024

Eloise Ivy R. Garcia
GHD
L4 211 Victoria Square
ADELAIDE SA 5000

Dear Eloise,

Approval to Install Groundwater Monitoring Wells in Carlisle Street, Graham Crescent and Irwin Court, CAMDEN PARK

In response to your application dated 15 August 2024 to install multiple groundwater monitoring wells in Carlisle Street, Graham Crescent and Irwin Court, CAMDEN PARK within the City of West Torrens, **approval is granted** subject to all relevant information requested having been provided and that any variations to the information provided shall be notified to Council immediately so as to avoid any breach of this approval. Conditions on this approval are enclosed.

- Service searches have been undertaken and received via BYDA.
- The following information is provided to Council prior to commencement of any works within Council land:
  - Site Plan and/or Aerial Diagram of the proposed work;
  - Certificate for Public Liability Insurance against damage or negligence to council property and members of the general public. The insurance cover must have a value of $20 million and it shall be current for the period whilst the soil vapour bores remain on council land;
  - Traffic Management Plan should any works be likely to cause traffic disruption on the Council road, in which access arrangements to any property within the area of drilling must be considered;
  - A courtesy letter to notify residents or businesses adjacent to the proposed work shall be undertaken prior to commencement of any drilling to avoid any uncertainness or disputes.
- The contractor and/or property owner will be liable for any damaged caused to council's infrastructure or surrounding areas in relation to the works associated with the proposed work. Any works being undertaken remain the sole responsibility of contractor and/or property owner.

- Upon completion of the works, Council will undertake an inspection of the work area to clarify that the re-instatement undertaken remains in a similar condition to that which was existing.

- There is no timeframe provided on the date when the inspection will be undertaken by Council, thus, the contractor will at all material times, be responsible for the reinstatement.

- Any wastewater created as part of the boring process is not permitted to enter the Council stormwater system.

- Any spoil or contaminated material extracted during the drilling process or other means shall contain the material and dispose in an approved manner that complies with all legislative requirements.

- All groundwater extracted during the sampling and/or purging must be contained and disposed in an appropriate manner to minimise risk to health and the environment.

- The reinstatement of the pavement and verge area around the cap to the wells installed must be undertaken to the acceptance of Council standards.

- Notification to the Council is also required upon completion of drilling work to enable appropriate inspections of the reinstated installation.

- Upon completion of the proposed work, all costs to remove the well caps and remediate the verge area, will be at the contractor/property owners cost. Mandatory notification to Council upon decommissioning will be required to enable appropriate inspections of the reinstatement work.

Council requests either an electronic copy or hard copy of all relevant documentation in relation to the drilled wells and test results on an ongoing basis shall be directed to our Environmental Department for future database referencing.

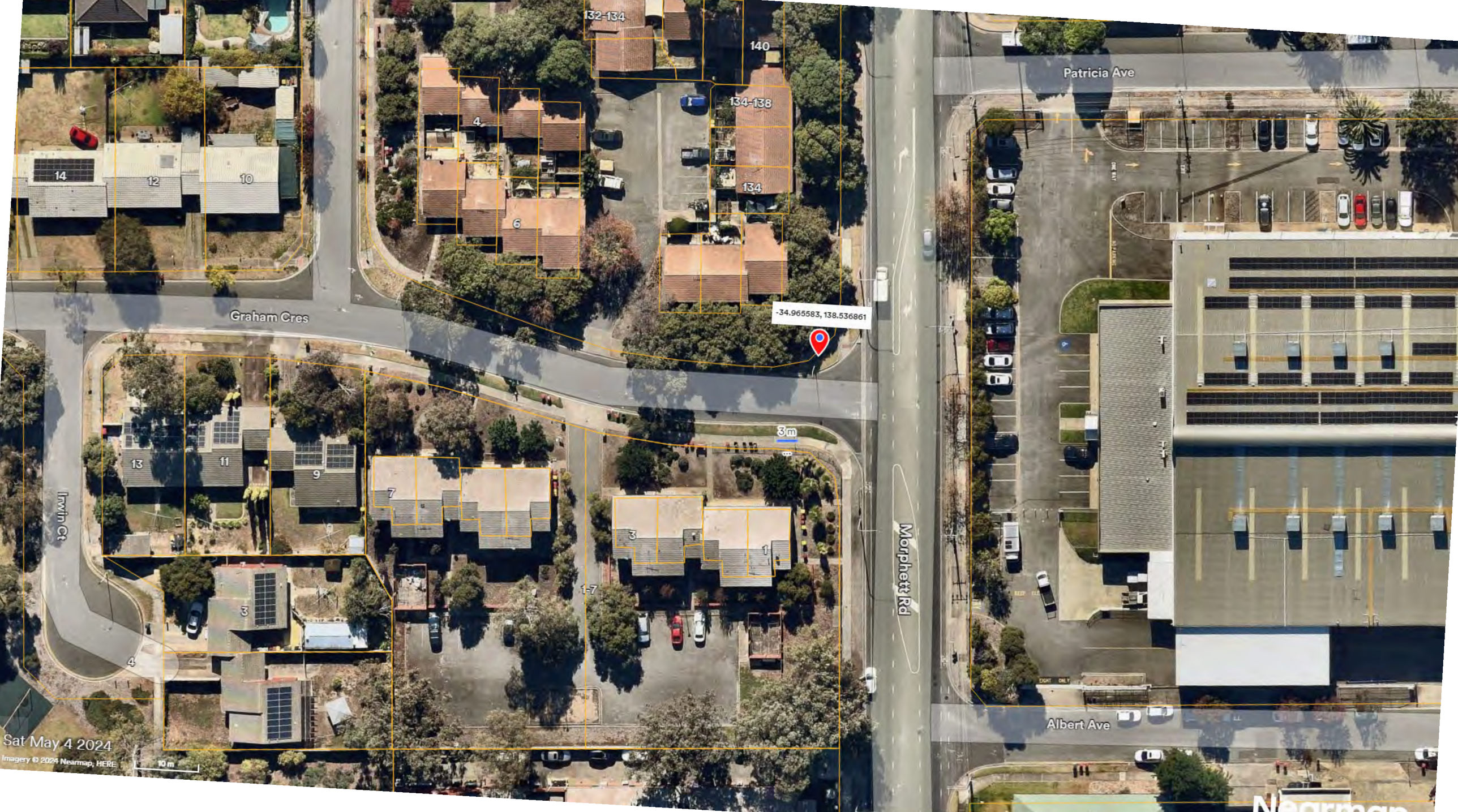
Should you require further information, please contact Council through Customer Contact Centre on 8416 6333 or by email: info@wtcc.sa.gov.au.

Yours sincerely

Joe Ielasi

Joe Ielasi
Manager City Assets

Encl Site Plan for Proposed Locations for Monitoring Wells


Graham Cres
Irvin Ct
Morphett Rd
Patricia Ave
Albert Ave
-34.965583, 138.536861
3 m
14
12
10
132-134
140
4
134-138
6
134
13
11
9
7
3
1
1-7
3
4
Sat May 4 2024
Imagery © 2024 Nearmap, HERE
10 m


Graham Cres
Irwin Ct
Thomson Ct
Thomson Ct
-34.966106, 138.535601
23
19
19-33
13
11
9
7
3
1
1-7
3m
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12
13
122-126
6
Sat May 4 2024
Imagery © 2024 Nearmap, HERE
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Nearmap


Albert Ave
Albert Ave
Carlisle St
-34.966729, 138.538287
65-69
58
56-62
61-63
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52
59
32
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28
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60
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58A
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57B
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16A
16B
16C
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14
Sat May 4 2024
Imagery © 2024 Nearmap, HERE
Nearmap

Well Permit

Permit to undertake a Water Affecting Activity

Pursuant to section 112 of the Landscape South Australia Act 2019

Subject to full compliance with all the procedures, specifications and limitations contained or referred to in the conditions set out below.

Permission is hereby granted to

GHD Pty Ltd

Permit Number:	**P-503263**
Permit Term:	**1 year(s)**
Expiry Date:	**9 August 2025**

To undertake the following water affecting activity

Activity	**Construct a new well**
Well Use	**Monitoring or Investigation**
At location	**138.53829176,-34.96673123199997** **CT5516/645, D2237A12**

Conditions

265613	WAA-100 - The activity authorised by this permit must only be undertaken on the land identified as follows: CT5516/645 D2237A12
265614	WAA-102 - The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, shall not adversely affect the quality of an underground water resource.
265615	WAA-103 - Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.
265620	WAA-110 - The authorised activity must be undertaken by a licensed driller.
265628	WAA-318 - The well driller must submit a Well Completion Report to the Department within 30 days of completion of each activity authorised by this well construction permit.
265616	WAA-105 - Water samples are required from all wells drilled in respect of this permit.
265621	WAA-111 - If the well is considered unsatisfactory, it may be abandoned and a replacement well may then be constructed provided that the abandoned well is backfilled prior to the drill rig leaving the site.
265617	WAA-106 - Strata samples are not required.
265618	WAA-107 -The licensed well driller must forward with the report a plan obtained from the permit holder, who must mark thereon the location of all wells drilled in respect of this permit.
265619	WAA-108 - All wells must be drilled vertical unless written permission is obtained from the Minister.
265622	WAA-133 - All groundwater extracted during sampling and/or purging must be contained and disposed of in an appropriate manner to minimise risk to health and the environment.
265623	WAA-134 - This permit does not authorise the taking of water from the well for any purpose other than testing.
265624	WAA-136 - Wells are to be backfilled when no longer required for ongoing monitoring or investigation purposes.
265625	WAA-143 - This permit authorises the construction of a well on the portion of road adjacent to the land parcel described above.
265626	WAA-149 - Due to known soil/groundwater contamination in the sediments and aquifers above, cautions should be taken in the drilling and cementing of this well.
265627	WAA-154 - The well is not to penetrate beyond a maximum depth of 20 metres unless approved by the Regional Hydrogeologist.

AUTHORISATION: MINISTER FOR CLIMATE, ENVIRONMENT AND WATER

Date: 9 August 2024

GPO Box 1047, Adelaide SA 5001 MyWatermail@sa.gov.au mywater.sa.gov.au 08 8463 6876

GPO Box 1047, Adelaide SA 5001 MyWatermail@sa.gov.au mywater.sa.gov.au 08 8463 6876

Additional information about the site use approval

Under section 216(1)(b)(ii) of the Act, you have a right of appeal to the Environment, Resources and Development Court against the imposition of any condition on this permit. The appeal must be instituted within six weeks of the date of permit issue. The appeal must also be served upon this department within that time.

The authority to undertake the water affecting activity, defined in the permit, is limited to the holder of the permit and cannot be assigned to another person. If the property upon which the permit work is to be undertaken is sold prior to the commencement of any work, the new landowner must make an application for a new permit.

The well construction permit is not an authorisation for a person to enter private property and prior authority must be obtained from the land owner in all circumstances.

The issue of this permit does not negate the requirement to comply with the provisions of other Acts that may impact on the activity undertaken pursuant of this permit.

This permit is not an approval to clear native vegetation. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. Clearance includes the draining or flooding of land, including actions that result in the substantial damage to native vegetation, this might include activities that lower the water tables and, as a result, impact on water dependent wetland communities. In most cases the clearance of native vegetation requires the consent of the Native Vegetation Council. Further information regarding native vegetation clearance approvals, is available from: http://www.environment.sa.gov.au/managing-natural-resources/native-vegetation.

It is recommended that all drilling equipment be decontaminated prior to construction of a new well or rehabilitation of an existing well to prevent the introduction or transfer of iron bacteria. Similar precautions should also be taken with pump installation equipment.

The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well or the replacement or alteration of the casing, lining or screen of a well shall not adversely affect the quality of an underground water resource.

Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.

The activity must not adversely affect water-dependent ecosystems nearby.

Activities shall not have an unacceptable detrimental impact on cultural, heritage or social values.

This work may be subject to inspection by the Department's Drilling Inspectors.

If the name or contact details of the holder or their company changes, then the holder must notify this department within 21 days of the change occurring. Names and contact details can be updated online through the mywater customer portal (mywater.sa.gov.au).

Take note that the permit holder, or a person acting on behalf of the permit holder, who contravenes or fails to comply with a condition of the permit is guilty of an offence, and such acts or omissions may result in the variation, suspension or revocation of the permit.

GPO Box 1047, Adelaide SA 5001 MyWatermail@sa.gov.au mywater.sa.gov.au 08 8463 6876

Well Permit

Permit to undertake a Water Affecting Activity

Pursuant to section 112 of the Landscape South Australia Act 2019

Subject to full compliance with all the procedures, specifications and limitations contained or referred to in the conditions set out below.

Permission is hereby granted to

GHD Pty Ltd

Permit Number:	**P-503264**
Permit Term:	**1 year(s)**
Expiry Date:	**9 August 2025**

To undertake the following water affecting activity

Activity	**Construct a new well**
Well Use	**Monitoring or Investigation**
At location	**138.536863682,-34.965585197999985**
	CT5492/748, F9353A3

Conditions

265634	WAA-100 - The activity authorised by this permit must only be undertaken on the land identified as follows: CT5492/748 F9353A3
265635	WAA-102 - The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, shall not adversely affect the quality of an underground water resource.
265636	WAA-103 - Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.
265641	WAA-110 - The authorised activity must be undertaken by a licensed driller.
265649	WAA-318 - The well driller must submit a Well Completion Report to the Department within 30 days of completion of each activity authorised by this well construction permit.
265637	WAA-105 - Water samples are required from all wells drilled in respect of this permit.
265642	WAA-111 - If the well is considered unsatisfactory, it may be abandoned and a replacement well may then be constructed provided that the abandoned well is backfilled prior to the drill rig leaving the site.
265638	WAA-106 - Strata samples are not required.
265639	WAA-107 -The licensed well driller must forward with the report a plan obtained from the permit holder, who must mark thereon the location of all wells drilled in respect of this permit.
265640	WAA-108 - All wells must be drilled vertical unless written permission is obtained from the Minister.
265643	WAA-133 - All groundwater extracted during sampling and/or purging must be contained and disposed of in an appropriate manner to minimise risk to health and the environment.
265644	WAA-134 - This permit does not authorise the taking of water from the well for any purpose other than testing.
265645	WAA-136 - Wells are to be backfilled when no longer required for ongoing monitoring or investigation purposes.
265646	WAA-143 - This permit authorises the construction of a well on the portion of road adjacent to the land parcel described above.
265647	WAA-149 - Due to known soil/groundwater contamination in the sediments and aquifers above, cautions should be taken in the drilling and cementing of this well.
265648	WAA-153 - The well is not to penetrate beyond a maximum depth of 15 metres unless approved by the Regional Hydrogeologist.

AUTHORISATION: MINISTER FOR CLIMATE, ENVIRONMENT AND WATER

Date: 9 August 2024

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Additional information about the site use approval

Under section 216(1)(b)(ii) of the Act, you have a right of appeal to the Environment, Resources and Development Court against the imposition of any condition on this permit. The appeal must be instituted within six weeks of the date of permit issue. The appeal must also be served upon this department within that time.

The authority to undertake the water affecting activity, defined in the permit, is limited to the holder of the permit and cannot be assigned to another person. If the property upon which the permit work is to be undertaken is sold prior to the commencement of any work, the new landowner must make an application for a new permit.

The well construction permit is not an authorisation for a person to enter private property and prior authority must be obtained from the land owner in all circumstances.

The issue of this permit does not negate the requirement to comply with the provisions of other Acts that may impact on the activity undertaken pursuant of this permit.

This permit is not an approval to clear native vegetation. In South Australia, native vegetation is protected by the *Native Vegetation Act 1991*. Clearance includes the draining or flooding of land, including actions that result in the substantial damage to native vegetation, this might include activities that lower the water tables and, as a result, impact on water dependent wetland communities. In most cases the clearance of native vegetation requires the consent of the Native Vegetation Council. Further information regarding native vegetation clearance approvals, is available from: http://www.environment.sa.gov.au/managing-natural-resources/native-vegetation.

It is recommended that all drilling equipment be decontaminated prior to construction of a new well or rehabilitation of an existing well to prevent the introduction or transfer of iron bacteria. Similar precautions should also be taken with pump installation equipment.

The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well or the replacement or alteration of the casing, lining or screen of a well shall not adversely affect the quality of an underground water resource.

Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.

The activity must not adversely affect water-dependent ecosystems nearby.

Activities shall not have an unacceptable detrimental impact on cultural, heritage or social values.

This work may be subject to inspection by the Department's Drilling Inspectors.

If the name or contact details of the holder or their company changes, then the holder must notify this department within 21 days of the change occurring. Names and contact details can be updated online through the mywater customer portal (mywater.sa.gov.au).

Take note that the permit holder, or a person acting on behalf of the permit holder, who contravenes or fails to comply with a condition of the permit is guilty of an offence, and such acts or omissions may result in the variation, suspension or revocation of the permit.

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Well Permit

Permit to undertake a Water Affecting Activity

Pursuant to section 112 of the Landscape South Australia Act 2019

Subject to full compliance with all the procedures, specifications and limitations contained or referred to in the conditions set out below.

Permission is hereby granted to

GHD Pty Ltd

Permit Number:	**P-503265**
Permit Term:	**1 year(s)**
Expiry Date:	**9 August 2025**

To undertake the following water affecting activity

Activity	**Construct a new well**
Well Use	**Monitoring or Investigation**
At location	**138.53558490700004,-34.966090613999995** **CT5550/253, D11239A105**

Conditions

265655	WAA-100 - The activity authorised by this permit must only be undertaken on the land identified as follows: CT5550/253 D11239 A105
265656	WAA-102 - The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, shall not adversely affect the quality of an underground water resource.
265657	WAA-103 - Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.
265662	WAA-110 - The authorised activity must be undertaken by a licensed driller.
265670	WAA-318 - The well driller must submit a Well Completion Report to the Department within 30 days of completion of each activity authorised by this well construction permit.
265658	WAA-105 - Water samples are required from all wells drilled in respect of this permit.
265663	WAA-111 - If the well is considered unsatisfactory, it may be abandoned and a replacement well may then be constructed provided that the abandoned well is backfilled prior to the drill rig leaving the site.
265659	WAA-106 - Strata samples are not required.
265660	WAA-107 -The licensed well driller must forward with the report a plan obtained from the permit holder, who must mark thereon the location of all wells drilled in respect of this permit.
265661	WAA-108 - All wells must be drilled vertical unless written permission is obtained from the Minister.
265664	WAA-133 - All groundwater extracted during sampling and/or purging must be contained and disposed of in an appropriate manner to minimise risk to health and the environment.
265665	WAA-134 - This permit does not authorise the taking of water from the well for any purpose other than testing.
265666	WAA-136 - Wells are to be backfilled when no longer required for ongoing monitoring or investigation purposes.
265667	WAA-143 - This permit authorises the construction of a well on the portion of road adjacent to the land parcel described above.
265668	WAA-149 - Due to known soil/groundwater contamination in the sediments and aquifers above, cautions should be taken in the drilling and cementing of this well.
265669	WAA-153 - The well is not to penetrate beyond a maximum depth of 15 metres unless approved by the Regional Hydrogeologist.

AUTHORISATION: MINISTER FOR CLIMATE, ENVIRONMENT AND WATER

Date: 9 August 2024

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The well construction permit is not an authorisation for a person to enter private property and prior authority must be obtained from the land owner in all circumstances.

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Appendix C

WaterConnect

WaterConnect

Groundwater Data Report

Government of South Australia
Department for Environment and Water

Circle Centre -34.966435,138.537435, Radius 2km

Unit No	Date	Cased To (m)	Max Depth (m)	Latest Depth (m)	SWL (m)	SWL Date	Yield (L/sec)	Yield Date	TDS (mg/L)	TDS Date	Aquifer	Permit No	Status	Obs No	SWL Status	Salinity Status	Purpose
6628-3921	16/02/1980	10.05	10.05	10.05	4	16/02/1980	0.3	16/02/1980	2312	10/02/1980	Qpah	90542					
6628-7837	01/01/1948		10.67	10.67	2.74	22/03/1948	1.89	22/03/1948	2127	01/01/1949	Qpah						
6628-7838			12.8	12.8	1.83	03/12/1935	7.58	03/12/1935	1199	03/12/1935	Qpah						
6628-7845	15/12/1949	104.24	160.02	160.02	0	15/12/1949	6.32	15/12/1949	1056	15/12/1949	Tomw(T1)		UKN				
6628-7846	03/04/1951		103.63	0	15.85	03/04/1951	6.32	03/04/1951	6600	30/11/1967	Tomw(T1)		DEC				
6628-7847	14/02/1927		115.82	92.96	0	14/02/1927	5.68	14/02/1927	1070	07/06/1957	Tomw(T1)		BKF				
6628-7848	14/01/1930	150.57	170.69	170.69	0	14/01/1930	1.26	14/01/1930	1000	29/02/1960	Tomw(T2)						
6628-7849	07/12/1956	72	114.6	79	0	07/12/1956	22.73	07/12/1956	1100	29/02/1960	Tomw(T1)	132612	RHB				
6628-7850	01/09/1909		88.7	88.7	0	01/09/1909					Tomw(T1)						
6628-7851			2.44	2.44					1027	26/03/1974	Qpah						
6628-7852	15/01/1968		153.31	0	0.01	21/09/1991			1077	17/12/1986	Tomw(T1)	30785	BKF	ADE130	H	H	IRR
6628-7853			2.44	2.44	0.61	05/02/1975			816	05/02/1975	Qpah						
6628-7859			4.57	4.57					4298	07/08/1934	Qpah						
6628-7860	06/10/1950		109.73	0	2.79	15/09/1998	0	01/01/1900	1199	08/03/1988	Tomw(T1)	293531	BKF	NOA001	H	H	OBS
6628-7861	22/09/1978	17	17	17	5	22/09/1978	0.76	22/09/1978	2058	25/09/1978	Qpah	2260	OPR				DRN
6628-7862	01/01/1951		5.49	5.49	3.05	30/10/1967			3945	30/10/1967	Qpah						
6628-7863	01/01/1934		3.05	3.05					2287	04/09/1934	Qpah						
6628-7865			48.62	48.62			3.79	01/01/1945	685	23/06/1945	Qpah						
6628-7872			5.18	5.18	3.81	29/05/1951			2545	29/05/1951	Qpah						
6628-7873			3.96	3.96	1.52	06/09/1949			6077	06/09/1949	Qpah						
6628-7874			5.49	5.49	2.44	04/10/1949			6850	04/10/1949	Qpah						
6628-7875	01/01/1914		92.96	92.96	0	22/08/1914	2.53	22/08/1914	1185	17/08/1914	Tomw(T2)						
6628-7876		1.83	9.14	9.14	1.83	30/10/1967			670	30/10/1967	Qpah						
6628-7877			5.49	5.49	2.44	14/09/1949			1959	14/09/1949	Qpah						
6628-7915			85.34	85.34	0.91	03/12/1937			2170	03/12/1937	Tomw(T1) Tomw(T2)						
6628-7916	01/01/1972	76.2	79.24	79.24	10.24	07/11/1972	7.58	07/11/1972	2909	17/05/1972	Tomw(T1)						
6628-7932		18.29	18.29	18.29	6.1	05/10/1949			3460	05/10/1949	Qpah						
6628-8039					0	20/08/1976			827	20/08/1976	Qpah						
6628-8040	12/03/1948		12.8	12.8							Qpah						
6628-8041			13.11	13.11							Qpah						
6628-8042			13.72	13.72							Qpah						
6628-8043			12.19	12.19							Qpah						
6628-8044	30/04/1951	66.14	91.44	91.44	14.33	30/04/1951	6.06	30/04/1951	1145	29/02/1960	Tomw(T1)						
6628-8045	22/09/1964	84.23	106.68	106.68	0.29	03/09/2024	15.16	22/09/1964	1289	21/02/2013	Tomw(T1)		UKN	ADE148	C	H	OBS
6628-8046			86.26	86.26	2.74	19/11/1914			2130	19/11/1914	Tomw(T1)						
6628-8047		14.02	14.02	14.02	3.66	10/12/1975	1.3	10/12/1975	3236	10/12/1975	Qpah						

Unit No	Date	Cased To (m)	Max Depth (m)	Latest Depth (m)	SWL (m)	SWL Date	Yield (L/sec)	Yield Date	TDS (mg/L)	TDS Date	Aquifer	Permit No	Status	Obs No	SWL Status	Salinity Status	Purpose
6628-8048	30/03/1946	103.81	140.51	140.51	7.92	06/06/1947	8.21	06/06/1947	843	05/03/1952	Tomw(T1)						
6628-8049			4.72	4.72	4.62	08/11/1967	0	08/11/1967	2030	08/11/1967	Qpah						
6628-8050			90	90	0	06/05/1945	1.89	06/05/1949	1013	06/05/1949	Tomw(T1)						
6628-8051									956	01/01/1914	Tomw(T1)						
6628-8052	18/01/1946	90	103.63	100	-0.09	03/09/2024	8.84	15/12/1948	865	25/08/1986	Tomw(T1)	40413	CFL	ADE014	C	H	MON
6628-8053	05/11/1959		7.32	0	0.84	05/11/1959			11440	05/11/1959	Qpah	297084	BKF				
6628-8054		49.07	60.96	60.96	2.74	06/05/1949	0.63	06/05/1949	11738	06/05/1949							
6628-8055	01/01/1939		60.96	60.96	0.61	04/04/1946	3.79	04/04/1946	985	04/04/1946							
6628-8056	01/01/1951		1.28	1.28	1.23	31/12/1951			22880	01/02/1952	Qpah						
6628-8057			4.27	4.27					7839	09/02/1937	Qpah						
6628-8058			12.19	12.19			0.25	01/01/1949	4990	06/05/1949	Qpah						
6628-8059	01/01/1914		111.86	0	1.68	03/08/1955	15.16	01/01/1949	1730	21/04/1955	Tomw(T1) Tomw(T2)		DEC				
6628-8060			17.98	17.98	2.13	16/10/1934			5140	16/10/1934	Qpah						
6628-8061	01/04/1945	35.36	36.58	36.58	1.69	25/09/1984	10.1	01/05/1949	910	22/08/2007	Tomw(T1)			ADE149	H	H	OBS
6628-8062			42.67	42.67	7.01	28/02/1959	12.63	28/02/1959	370	02/08/2004	Tomw(T1)						OBS
6628-8063	30/09/1914		103.63	0	1.07	30/09/1914	10.1	01/01/1949	5698	11/12/2001	Tomw(T2)	100327	DEC				
6628-8064	01/01/1915		96.01		5.49						Tomw(T1)						
6628-8065	01/01/1949		7.62	7.62	6.1	29/04/1949	1.89	29/04/1949	2630	29/04/1949	Qpah						
6628-8066			4.88	4.88	3.66	19/03/1951			2685	19/03/1951	Qpah						
6628-8067	01/01/1950		3.51	3.51	2.74	10/11/1967			3730	10/11/1967	Qpah						
6628-8068	01/01/1951	1.52	23.77	23.77	3.2	11/05/1951	1.89	11/05/1951	1530	06/10/1951	Qpah						
6628-8069			6.4	6.4	5.79	04/11/1967			3245	04/11/1967	Qpah						
6628-8070	01/01/1967		7.01	7.01	2.74	18/12/1967	0.57	18/12/1967	3385	18/12/1967	Qpah						
6628-8071			7	7	2.7	18/12/1967			3315	18/12/1967	Qpah						
6628-8075	02/03/1977		8.53	8.53	2.89	07/05/2019	0	01/01/1900	1597	09/03/1988	Qpah(Q1)	1239		ADE120	H	N	OBS
6628-8076			6.71	6.71	2.44	07/12/1967	0.24	07/12/1967	2285	07/12/1967	Qpah						
6628-8077			81.69	81.69	5.49	13/12/1933	7.58	13/12/1933	913	13/12/1933	Tomw(T1)						
6628-8078		64	76.2	76.2	0.61	14/12/1933	2.53	14/12/1933	871	14/12/1933	Tomw(T1)						
6628-8079	01/01/1934		60.96	60.96	7.62	06/05/1949	10.1	06/05/1949	971	06/05/1949							
6628-8080			54.86	54.86			3.79	01/01/1949	871	06/05/1949							
6628-8081	08/09/1914	42	70.7	57	4.49	05/09/2024	5	31/10/1985	1485	10/11/2005	Tomw(T1)	94199	RHB	ADE015	C	H	OBS
6628-8082			76.81	0			0.51				Tomw(T1)	292187	DEC				
6628-8083	01/01/1914		37.19	37.19			5.68	01/01/1934	871	10/11/1934	Qpah						
6628-8084	08/08/1968		81.38	0	4.73	02/06/2015			1183	02/06/2015	Tomw(T1)	239990	DEC				
6628-8085			7.32		2.13	07/11/1967			3180	07/11/1967	Qpah						
6628-8086			40.5	40.5					67	21/10/1914	Tomw(T1)						
6628-8087			12.19	12.19					2730	06/05/1949	Qpah						
6628-8088			2.74	2.74	2.13	25/01/1968			3030	25/01/1968	Qpah						
6628-8091			11.43	11.43	2.36	22/02/1952			3945	22/02/1952	Qpah						
6628-8097	28/08/1934		54.86	54.86	3.66	28/08/1934	10.1	28/08/1934	1070	28/08/1934	Tomw(T1)						
6628-8099			9.14	9.14	4.57	07/05/1968			9170	07/05/1968	Qpah						

Unit No	Date	Cased To (m)	Max Depth (m)	Latest Depth (m)	SWL (m)	SWL Date	Yield (L/sec)	Yield Date	TDS (mg/L)	TDS Date	Aquifer	Permit No	Status	Obs No	SWL Status	Salinity Status	Purpose
6628-8101	01/01/1914								943	24/10/1914	Qpah						
6628-8102	24/10/1968		83.51	0	0	28/11/1989	7.4	07/02/1973	1049	02/12/1986	Tomw(T1)	95313	DEC				IRR
6628-8104	13/11/1945	50.29	77.42	77.42	7.92	13/11/1945	10.1	13/11/1945	1000	22/04/1955	Tomw(T1)						
6628-8105		53	76.2	55.34	7.17	05/09/2024	10.1	16/09/1968	936	08/12/2014	Tomw(T1)	27711	RHB	ADE017	C	H	OBS
6628-11501	25/08/1990		109.73	0	10.66	24/10/1990	25.26	22/10/1990	1222	31/08/1990	Tomw(T2)	301464	DEC				RCL
6628-11505			103.63	103.63			8.84	01/01/1964			Tomw(T1)						
6628-11547	22/12/1980		14.4		3	22/12/1980	0.25	22/12/1980	938	23/12/1980	Qpah	7858	BKF				
6628-11693	15/11/1980	41	52	52	2	15/11/1980			1158	24/01/2005	Tomw(T1)	7961					OBS
6628-11694	10/11/1980	40	47.5	44.5	4.5	10/11/1980			970	13/08/2009	Tomw(T1)	62815	RHB				MON
6628-11898	16/12/1981	18.8	20.1	20.1	2.4	16/12/1981	0.75	16/12/1981	2909	16/12/1981	Qpah	9557					
6628-11938	05/02/1982	26.2	26.2	26.2	7.5	05/02/1982	1.75	05/02/1982	1945	05/02/1982	Qpah						
6628-11941	16/05/1979	12	14	14	3	16/06/1986	0.75	16/05/1979			Qpah	5612					
6628-12151	12/02/1983	11.5	11.5	11.5	4	12/02/1983	0.5	12/02/1983	2143	01/01/1983	Qpah	11967					
6628-12152	24/01/1983	10.9	10.9	10.9	3.3	24/01/1983	1	24/01/1983	2369	24/01/1983	Qpah	11872	OPR				DOM
6628-12277	04/05/1983	14.6	14.6	14.6	1.8	04/05/1983	1.6	04/05/1983	6176	04/05/1983	Qpah	12407	BKF				
6628-12293	29/11/1982	10.9	10.9	10.9	2.1	29/11/1982	1	29/11/1982	1687	29/11/1982	Qpah	11233					
6628-12295	23/03/1983	18.5	18.5	18.5	6	23/03/1983	0.9	23/03/1983	13701	23/03/1983	Qpah	12769					
6628-12306	01/07/1982		18.29	18.29	2.13	01/07/1982			12163	20/07/1982	Qpah	10554					
6628-12307	01/03/1983		15									12087	BKF				
6628-12312	01/09/1982	15.24	15.24	15.24	3	01/09/1982	0.5	01/09/1982	2058	01/09/1982	Qpah	10638					
6628-12313			7		5	17/06/1983	0.5	17/06/1983	1340	07/04/1983	Qpah	11966					
6628-12338	11/12/1980		9.6		3.13	16/06/1986	0.75	11/12/1980	3943	11/12/1980	Qpah	91119					
6628-12362	05/06/1983	13.7	13.7	13.7	4.2	05/06/1983	0.6	05/06/1983	1748	05/06/1983	Qpah	12888					
6628-12454	25/09/1968		48.77	0	6	25/09/1968	6	25/09/1968	1700	01/07/2003	Qpah	62814	ABD				
6628-12488	13/09/1983		7.9	7.9	1.8	13/09/1983					Qpah	12674	BKF				
6628-12531	26/08/1983		12.8	12.8	3.3	26/08/1983	1	26/08/1983			Qpah	13170	BKF				
6628-12868	30/03/1984	24	24	24					10511	05/04/1984	Qpah	14296	OPR				DRN
6628-12930	01/01/1984	9	9	9					3840	01/01/1984	Qpah	14571					
6628-12988	29/11/1983	23	24	24	3	29/11/1983	2.4	29/11/1983	2036	29/11/1983	Qpah	93177	OPR				STK
6628-13180	01/01/1985	6.09	6.09	6.09	1.95	01/01/1985			1748	13/02/1985	Qpah	15812	OPR				DOM
6628-13271	01/03/1985	20	20	20	3	01/03/1985	1	01/03/1985	3714	01/03/1985	Qpah	16352					
6628-13385	27/03/1985	11	11	11	4.5	27/03/1985	1		3712	27/02/1985	Qpah	16412	OPR				DRN
6628-13394	28/03/1985	8.5	8.5	8.5	2.1	28/03/1985	1				Qpah	16349	OPR				DOM
6628-13443	08/08/1985	9.1	9.14	9.14	1.83	04/09/1985	2.5		8400	04/09/1985	Qpah	17172	OPR				DRN
6628-13487	30/10/1985		75.5	65	7.75	01/12/2009	3	10/12/1987	1564	01/12/2009	Tomw(T1)	94185	RHB				
6628-13571	10/12/1985		12.2		4.12	16/06/1986	1.25	10/12/1985	1284	10/12/1985	Qpah	17720					
6628-13585	01/02/1986	6	6	6	5.5	01/02/1986	0.2	01/02/1986			Qpah	17987	BKF				
6628-13603	08/03/1986	13.18	13.82	13.82	5.18	08/03/1986	0.25	08/03/1986			Qpah	17146	OPR				DRN
6628-13607	01/12/1985		8		3.24	16/06/1986			1928	19/03/1986	Qpah	16426					
6628-13726	24/07/1986	20	20	20	4	25/08/1986	0.75	24/07/1986			Qpah	18645					
6628-13868	08/12/1986	6	8	8	4	05/02/1987	0.1	08/12/1986	1362	05/02/1987	Qpah	19165					
6628-13883	01/12/1986	5	5	5	3	01/12/1986	0.1	01/12/1986	2165	01/01/1986	Qpah	15403					

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6628-14026	05/11/1987	11	11	11	2	09/11/1987	0.5	05/11/1987	2852	10/11/1987	Qpah	20027	OPR				DRN
6628-14045	03/10/1987	7	9	9	2.7	17/11/1987	1.2	03/10/1987	991	17/11/1987	Qpah	20277					
6628-14099	26/02/1988	11	11	11	3	09/05/1988	0.95	26/02/1988	5181	09/05/1988	Qpah	20822					
6628-14284	29/04/1988	19	19	19	9.7	19/10/1988	0.63	29/04/1988	1732	19/10/1988	Qpah	19745	OPR				DOM
6628-14350	21/01/1988	9.1	9.1	9.1	2.2	06/02/1989	1.2	21/01/1988	5994	06/02/1989	Qpah	21665	OPR				DOM
6628-14507	01/07/1989	7.5	7.5	7.5	2.8	11/08/1989	1.2	01/07/1989	2574	11/08/1989	Qpah	22249	OPR				DOM
6628-14508	21/01/1989	10.6	10.6	10.6	3.5	06/02/1989	1.2	21/01/1989	3885	06/02/1989	Qpah	22017	OPR				DOM
6628-14525	17/06/1980		14.5	14.5							Qhck		ABD				INV
6628-14536	11/12/1981		7.5	7.5									ABD				INV
6628-14537	14/12/1981		10.5	10.5									ABD				INV
6628-14538	15/12/1981		9.85	9.85									ABD				INV
6628-14539	16/12/1981		10.25	10.25									ABD				INV
6628-14541	18/12/1981		10.6	10.6									ABD				INV
6628-14542	21/12/1981		10	10							Qpah		ABD				INV
6628-15112	01/01/1989		11	11	8	12/04/1989			4049	12/04/1989	Qpah	22117	OPR				DOM
6628-15392	15/09/1990	12	12	12	2.1	12/11/1990	1.5	15/09/1990	3023	12/11/1990	Qpah	24760	OPR				DOM
6628-15416	01/02/1988	10.5	10.5	10.5	5	01/02/1988	0.4	01/02/1988			Qpah	20890					
6628-15499	26/03/1991	11.2	11.2	11.2	5.8	03/04/1991	1	26/03/1991	1703	03/04/1991	Qpah	25490	OPR				REC
6628-15503	15/03/1991	10.5	10.5	10.5	5.2	03/04/1991	1	15/03/1991	2063	03/04/1991	Qpah	25391	OPR				DOM
6628-15506	04/04/1991		10.2	0	4.3	04/04/1991	1.5	04/04/1991	1664	19/04/1991	Qpah	28849	ABD				DOM
6628-15556	24/01/1991	179.7	215	211	6.7	24/01/1991	10	24/01/1991	1050	25/02/2005	Tomw(T1)	25171	OPR				MAR
6628-15600	17/08/1991	10.5	10.5	10.5	5.7	22/08/1991	1	17/08/1991	2567	22/08/1991	Qpah	25499	OPR				DOM
6628-15733	22/11/1991	20	20	20	4.5	22/11/1991			5298	22/11/1991	Qpah	26434	OPR				DOM
6628-15802	09/12/1991	18	18	18	3	09/12/1991			2001	09/12/1991	Qpah	26572	OPR				DOM
6628-15830	24/12/1991	10	10	10	4	21/01/1992	0.3	24/12/1991	2920	24/12/1992	Qpah	26748	OPR				DOM
6628-15831	24/12/1991	9	9	9	4	21/01/1992	0.5	24/12/1991	2046	24/12/1992	Qpah	26718	OPR				DOM
6628-15890	09/02/1992		15	15	15	14/02/1992			9941	14/02/1992	Qpah	26815	ABD				
6628-15901	07/02/1992	12	12	12	2	12/02/1992			3007	12/02/1992	Qpah	26915	OPR				DOM
6628-15924	22/02/1992	12	12	12	3	09/03/1992			5946	09/03/1992	Qpah	27035	OPR				DOM
6628-15954	16/03/1992	9	9	9	4.8	16/03/1992	0.75	16/03/1992	2830	16/03/1992	Qpah	26640	OPR				DOM
6628-15955	06/02/1992		18	18	6	24/03/1992	0.4	06/02/1992	1144	24/03/1992	Qpah	26960	BKF				
6628-15956	09/03/1992		12	12	9	24/03/1992	0.2	09/03/1992	1144	24/03/1992	Qpah	26960	BKF				
6628-16051	14/04/1992		15	15	6	14/05/1992	2	14/04/1992	5951	14/05/1992	Qpah	27404	BKF				
6628-16086	20/02/1992	18	18	18					2614	08/07/1992	Qpah	26812	OPR				DOM
6628-16174	30/10/1992	9.1	9.1	9.1	1.4	02/11/1992	0.75	30/10/1992	3667	02/11/1992	Qpah	28408	OPR				REC
6628-16180	19/09/1992	15	15	15	2.7	02/10/1992			3576	02/10/1992	Qpah	28173	OPR				DOM
6628-16387	04/11/1992	6	6	6	1.95						Qpah	28529					INV
6628-16388	04/11/1992	6	7	7	2.27						Qpah	28528					INV
6628-16389	04/11/1992	5	6	6	2.21						Qpah	28527					INV
6628-16554	28/01/1994	10	10	10					1061	31/01/1994	Qpah	30780					DOM
6628-16616	12/04/1994	20	20	20	4.6	12/04/1994			1945	05/04/1994	Qpah	31455					DOM
6628-16652	16/04/1994	14	14	14	4	16/04/1994			1519	16/04/1994	Qpah	31493					DOM

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6628-16710	17/05/1994	19	19	18.4	5	17/05/1994	0.5	17/05/1994	2047	17/05/1994	Qpah	31817					DOM
6628-16783	25/10/1994	16.5	16.5	16.5					8899	25/10/1994	Qpah	32773					DOM
6628-16862	21/10/1994	4	4	4							Qpah	32780					INV
6628-16863	21/10/1994	4	4	4							Qpah	32781					INV
6628-16864	21/10/1994	4	4	4							Qpah	32782					INV
6628-16865	20/10/1994	4.5	4.5	4.5	2.2	20/10/1994					Qpah	32783					INV
6628-16866	20/10/1994	4.5	4.5	4.5							Qpah	32784					INV
6628-16867	20/10/1994	4.5	4.5	4.5							Qpah	32785					INV
6628-16868	20/10/1994	4.5	4.5	4.5							Qpah	32786					INV
6628-16869	20/10/1994	4.5	4.5	4.5	2.2	20/10/1994					Qpah	32787					INV
6628-16870	24/10/1994	4.5	4.5	4.5	2.2	24/10/1994					Qpah	32788					INV
6628-16921	27/11/1994	20	20	20			1	27/11/1994	1703	27/11/1994	Qpah	31611					DOM
6628-16922	09/01/1995		6.5	0	3.3	09/01/1995					Qpah	33202	ABD				DOM
6628-16958	09/02/1995	20	20	20					3747	09/02/1995	Qpah	33822					DOM
6628-17018			4.96	4.96													
6628-17019			3.86	3.86									NOP				
6628-17024			8.62	8.62							Qpah						
6628-17025			3.74	3.74							Qpah						
6628-17089	27/02/1995	20.5	20.5	20.5					2323	27/02/1995	Qpah	34090					DOM
6628-17161	17/02/1995	9	9	9					1530	17/02/1995	Qpah	31217					DOM
6628-17163	23/02/1995	23.7	23.7	23.7	5.7	23/02/1995			2205	23/02/1995	Qpah	34316	NIU				DOM
6628-17192	03/05/1994		5.4	5.4							Qhck		UKN				
6628-17364	17/06/1995	22.5	22.5	22.5			1.5	17/06/1995	2171	17/06/1995	Qpah	35133					DOM
6628-17365	13/07/1995	9	9	0			0.2	13/07/1995			Qpah	35369	ABD				DRN
6628-17386	04/08/1995	4	4	4	2.21	04/08/1995			1821	04/08/1995	Qpah	35635					OBS
6628-17387	04/08/1995	4.5	4.5	4.5	2.36	04/08/1995			2909	04/08/1995	Qpah	35634					OBS
6628-17388	04/08/1995	4.61	4.61	4.5	2.01	04/08/1995			3150	04/08/1995	Qpah	35633					OBS
6628-17389	04/08/1995	4.58	4.58	4.5	2.09	04/08/1995			2978	07/08/1995	Qpah	35632					OBS
6628-17390	04/08/1995	4.53	4.53	4.5	1.98	04/08/1995			2716	04/08/1995	Qpah	35631					OBS
6628-17461	24/11/1995	18	18	18			0.5	24/11/1995	2375	24/11/1995	Qpah	34616					DOM
6628-17477	23/11/1995		16	16			2	23/11/1995	2375	12/02/2012	Qpah	36230					DOM
6628-17513	06/09/1995	79.5	108	108			20	06/09/1995	1194	25/02/2005	Tomw(T1)	35617	CFL				IRR
6628-17548	04/10/1995	24	24	24			0.5	04/10/1995	4771	04/10/1995	Qpah	34085					DRN
6628-17653	23/01/1996	20	20	20					1804	23/01/1996	Qpah	34813					DOM
6628-17808	30/10/1995	30	30	30	4	30/10/1995			4205	11/12/2001	Qpah	34814					DOM
6628-17810	13/12/1995	20	20	20			0.5	13/12/1995	7190	13/12/1995	Qpah	36057					DOM
6628-17812	27/02/1996	14	14	14			0.25	27/02/1996	4905	27/02/1996	Qpah	36772					DOM
6628-17818	04/04/1996	19	19	0			0.35	04/04/1996			Qpah	37313	ABD				DOM
6628-17844	07/02/1996	12	12	12			0.5	07/02/1996	5670	07/02/1996	Qpah	36916					DOM
6628-17880	14/04/1996	9	9	9	5	14/04/1996					Qpah	37554					DOM
6628-17969	06/09/1996	12	12	12			1	06/09/1996	7924	06/09/1996	Qpah	38470					DOM
6628-18065	31/10/1995	4	4	4					2030	08/11/1995	Qpah	37542					OBS

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6628-18066	31/10/1995	4	4	4					2653	08/11/1995	Qpah	37542					OBS
6628-18067	31/10/1995	4	4	4					2199	08/11/1995	Qpah	37542					OBS
6628-18091	28/10/1996		10	10			0.24	28/10/1996	3407	28/10/1996	Qpah	37443					DOM
6628-18093	06/11/1996	11	11	11			1.25	06/11/1996	8402	06/11/1996	Qpah	38221					DOM
6628-18233	28/12/1996	15	15	15	4.5	28/12/1996			9574	28/12/1996	Qpah	39238					DOM
6628-18494	26/04/1997	22	22	22	6	26/04/1997	1	26/04/1997	6332	19/04/1997	Qpah	41151	OPR				DOM
6628-18567	06/04/1997	37	82	82	8	06/04/1997	40	30/04/1997	1110	02/03/2005	Tomw(T1)	41135	OPR				IND
6628-18726	13/11/1997	17	17.5	17.5	4	13/11/1997	60	13/11/1997	4968	13/11/1997	Qpah	42938					DOM
6628-18773	15/11/1997	30	30	30	9	15/11/1997	0.5	13/11/1997	5880	15/11/1997	Qpah	43037					DOM
6628-18867	26/02/1998	12	12	12	3	26/02/1998	0.25	26/02/1998	3846	02/03/1998	Qpah	43917					DOM
6628-19058	12/06/1998	6	6	6	2.4	12/06/1998	0.2	12/06/1998			Qpah	45351					MON
6628-19059	12/06/1998	6	6	6	2.5	12/06/1998	0.2	12/06/1998			Qpah	45352					MON
6628-19060	12/06/1998	6	6	6	2.5	12/06/1998	0.2	12/06/1998			Qpah	45353					MON
6628-19061	12/06/1998	6	6	6	2.4	12/06/1998	0.2	12/06/1998			Qpah	45354					MON
6628-19273	06/07/1998	18	18	18	1.85	06/07/1998	3.8	06/07/1998	3390	06/07/1998	Qpah	45382					DRN
6628-19336	25/01/1999	18	18	18	4.5	25/01/1999	1	25/01/1999	3246	25/01/1999	Qpah	47499					DOM
6628-19337	15/01/1999	12	12	12	2	15/01/1999	1	15/01/1999	6925	14/01/1999	Qpah	47609					DOM
6628-19642	23/02/1999	4	4	4	2	23/02/1999	0.01	23/02/1999			Qpah	48022					MON
6628-19643	23/02/1999	4	4	4	2	23/02/1999	0.01	23/02/1999			Qpah	48145					MON
6628-19644	23/02/1999	4	4	4	2	23/02/1999	0.01	23/02/1999			Qpah	48146					MON
6628-19645	23/02/1999	4	4	4	2	23/02/1999	0.01	23/02/1999			Qpah	48147					MON
6628-19646	23/02/1999	4	4	4	2	23/02/1999	0.01	23/02/1999			Qpah	48148					MON
6628-19647	23/02/1999	4	4	4	2	23/02/1999	0.01	23/02/1999			Qpah	48149					MON
6628-19648	23/02/1999	4	4	4	2	23/02/1999	0.01	23/02/1999			Qpah	48150					MON
6628-19699	15/09/1999	12	12	12	3	15/09/1999			4031	20/11/1999	Qpah	47973					DOM
6628-20162	08/03/2000	12	12.5	12.5	2.2	08/03/2000	1	08/03/2000	2561	08/03/2000	Qpah	51471					DOM
6628-20200	03/03/2000		20	0								51890	BKF				
6628-20346	25/09/2000	8	8	8	3.5	25/09/2000	0.5	25/09/2000	1743	25/09/2000	Qpah	53649					DRN
6628-20470									2391	08/11/1996	Qpah	38952					
6628-20471									2025	08/11/1996	Qpah	38953					
6628-20529	20/02/2001	14.5	14.5	14.5	6	20/02/2001	3	20/02/2001	1681	20/02/2001	Qpah	54703					DOM
6628-20604	23/05/2001	15	15	15	4	23/05/2001	0.8	23/05/2001	2121	23/05/2001	Qpah	55532					DOM
6628-20837	09/04/2002	8	8	8	2.2	09/04/2002			1973	09/04/2002	Qpah	57950					DOM
6628-20947	14/11/2002		4.5	0							Qpah	61648	ABD				MON
6628-20948	14/11/2002	1.6	4.5	4.5							Qpah	60207					MON
6628-20949	14/11/2002	1.6	4.5	4.5							Qpah	60205					MON
6628-21043	09/08/2002	11	36	36	11	09/08/2002	0.5	07/08/2002	1485	09/08/2002	Qpah	58211					DOM
6628-21044	27/07/2002	15	29	29	15	27/07/2002	0.5	26/07/2002	1867	27/07/2002	Qpah	58212					DOM
6628-21045	20/02/2002	38.5	75	75	10	20/02/2002	40	20/02/2002	1100	18/03/2009	Tomw(T1)	57463	OPR				IRR
6628-21046	23/02/2002	39	75.1	75.1	10	23/02/2002	40	23/02/2002	940	09/09/2008	Tomw(T1)	57462	OPR				IRR
6628-21067	05/02/2003	1.5	4.5	4.5	3.5	05/02/2003					Qpah	61064					MON
6628-21068	05/02/2003	2	5	5	2.5	05/02/2003					Qpah	61065					INV

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6628-21093	17/09/2002	1.5	3	3	2.4	17/09/2002					Qpah	59459					INV
6628-21094	17/09/2002	1.5	3	3	1.8	17/09/2002					Qhck	59460					INV
6628-21095	17/09/2002	1.5	3	3	2	17/09/2002					Qpah	59458					INV
6628-21096	17/09/2002	0.5	2	2	0.7	17/09/2002					Qpah	59457					INV
6628-21097	17/09/2002	1.5	3	3	1.8	17/09/2002					Qpah	59454					INV
6628-21098	17/09/2002	1	2.5	2.5	0.79	17/09/2002					Qpah	59455					INV
6628-21099	17/09/2002	0.5	2	2	0.5	17/09/2002					Qpah	59453					INV
6628-21113	23/11/2002	9	9	9	4	23/11/2002	1.75	23/11/2002	2210	23/11/2002	Qpah	60176					DRN
6628-21127	19/10/2001		10	0	2.4	19/10/2001			6389	19/10/2001	Qpah	56485	BKF				DOM
6628-21156	25/03/2003		5	5													INV
6628-21226	05/05/2003	5	5	5	3	05/05/2003					Qpah	62052					MON
6628-21228	05/05/2003	5	5	5	3	05/05/2003					Qpah	62053					MON
6628-21294	06/08/2003	1.5	4.5	4.5							Qpah	62423					MON
6628-21295	06/08/2003	1.5	4.5	4.5							Qpah	62424					MON
6628-21296	06/08/2003	1.4	4.4	4.4							Qpah	62425					MON
6628-21329	05/06/2003	15	18	18	5.8	05/06/2003	0.5	05/06/2003	3731	05/06/2003	Qpah	62215					DOM
6628-21334	28/05/2003	3	10	10	3	28/05/2003	1	28/05/2003	2841	28/05/2003	Qpah	61824					DOM
6628-21335	28/05/2003	7	15	15	4	28/05/2003	1.3	28/05/2003	4280	28/05/2003	Qpah	60608					DOM
6628-21357	30/05/2003	1.5	4.5	4.5							Qpah	62096					INV
6628-21358	30/05/2003	5	5	5	2.8	30/05/2003					Qpah	62098					MON
6628-21375			4.5	0								50746	BKF				
6628-21376			4.5	0								50845	BKF				
6628-21377			4.5	0								50846	BKF				
6628-21378			4.5	0								50847	BKF				
6628-21379			4.5	0								50848	BKF				
6628-21380			4.5	0								50849	BKF				
6628-21381			4.5	0								50850	BKF				
6628-21382			4.5	0								50851	BKF				
6628-21383			4.5	0								50852	BKF				
6628-21384			4.5	0								50853	BKF				
6628-21385			4.5	0								50854	BKF				
6628-21386			4.5	0								50855	BKF				
6628-21387			4.5	0								50856	BKF				
6628-21486	26/05/2003	5.5	5.5	5.5	2.5	26/05/2003					Qpah	62344					INV
6628-21487	26/05/2003	2	5	5	2.5	26/05/2003					Qpah	62345					INV
6628-21488	26/05/2003	1.5	4.5	4.5	2.5	26/05/2003					Qpah	62346					INV
6628-21490	12/06/2003	2	2	2							Qpah	62299					INV
6628-21845	13/07/2004	8	10	10	3.4	13/07/2004	0.2	13/07/2004	8130	13/07/2004	Qpah	65769					IRR
6628-22052	10/11/2004	1.6	4.5	4.5							Qpah	102326					
6628-22053	09/11/2004	1.2	4.2	4.2							Qpah	102167					
6628-22054	09/11/2004	1.6	4.5	4.5							Qpah	102166					
6628-22055	09/11/2004	1.8	4.8	4.8							Qpah	102165					

Unit No	Date	Cased To (m)	Max Depth (m)	Latest Depth (m)	SWL (m)	SWL Date	Yield (L/sec)	Yield Date	TDS (mg/L)	TDS Date	Aquifer	Permit No	Status	Obs No	SWL Status	Salinity Status	Purpose
6628-22056	09/11/2004	1.2	4.2	4.2							Qpah	102164					
6628-22057	09/11/2004	1	4	4							Qpah	102163					
6628-22058	09/11/2004	1	4	4							Qpah	102162					
6628-22059	08/11/2004	1	4	4							Qpah	102161					
6628-22060	08/11/2004	0.8	3.8	3.8							Qpah	102160					
6628-22104	22/03/2005	2	5	5	3.01	22/03/2005			2369	23/03/2005	Qpah	105765					MON
6628-22105	15/03/2005	2	5	5	2.93	15/03/2005			2227	23/03/2005	Qpah	105766					MON
6628-22106	15/03/2005	2	5	5	2.53	15/03/2005					Qpah	105767					MON
6628-22107	21/03/2005	2	5	5	2.93	21/03/2005			2426	23/03/2005	Qpah	105768					MON
6628-22108	21/03/2005	2	5	5	3.01	21/03/2005			842	23/03/2005	Qpah	105769					MON
6628-22109	16/03/2005	2	5	5	2.29	16/03/2005					Qpah	105770					MON
6628-22110	21/03/2005	2	5	5	3.36	21/03/2005					Qpah	105771					MON
6628-22111	15/03/2005	2	5	5	3.25	15/03/2005			2460	22/03/2005	Qpah	105772					MON
6628-22112	21/03/2005	2	5	5	3.18	21/03/2005			1088	23/03/2005	Qpah	105773					MON
6628-22113	15/03/2005	5.7	5.7	5.7	2.64	15/03/2005			1485	22/03/2005	Qpah	105774					MON
6628-22114	15/03/2005	2	5	5	2.54	15/03/2005			2001	22/03/2005	Qpah	105775					MON
6628-22115	21/03/2005	2	5	5	2.81	21/03/2005			1602	23/03/2005	Qpah	105776					MON
6628-22321	04/10/2005	150	221	210			12	04/10/2005	435	20/09/2019	Tomw(T2)	109840	NIU				MAR
6628-22322	12/10/2005	155	196.7	188	7	12/10/2005	10	11/10/2005	1039	19/10/2005	Tomw(T1)	109841	OPR				MAR
6628-22324	10/11/2005	2	6	6					2177	10/11/2005	Qpah	106219					
6628-22325	27/01/2005	2	4	4	3.5	27/01/2005	4	27/01/2005			Qpah	104476					
6628-22592	30/05/2006	1.5	4.5	4.5	2.6	30/05/2006					Qpah	119424					INV
6628-22593	30/05/2006	1.5	4.5	4.5	2.6	30/05/2006					Qpah	119425					INV
6628-22594	30/05/2006	1.5	4.5	4.5	2.6	30/05/2006					Qpah	119426					INV
6628-22595	30/05/2006	1.5	4.5	4.5	2.6	30/05/2006					Qpah	119427					INV
6628-22618	28/08/2006	3	6	6	1.12	28/08/2006					Qpah	121625					INV
6628-22630		3	6	6	5.2	09/11/2005					Qpah	111021	NOP				MON
6628-22780	18/01/2007		10	0			1.5	18/01/2007	11098	18/01/2007	Qpah	125500	BKF				
6628-22870	14/11/2005	1.5	4.5	4.5	1.7	14/11/2005					Qpah	111748					MON
6628-22871	14/11/2005	1.2	4.2	4.2	1.3	14/11/2005					Qpah	111749					MON
6628-22872	14/11/2005	1	4	4							Qpah	111750					MON
6628-23017	22/03/2007	34	34	34	15	22/03/2007	0.3	21/03/2007	908	21/03/2007	Tomw(T1)	128887					
6628-23305	02/10/2007	2.7	5.7	5.7	4.2	02/10/2007					Qpah						MON
6628-23306	29/10/2007	2.9	6	6							Qpah						
6628-23307	29/10/2007	2.8	5.8	5.8							Qpah						
6628-23315	07/11/2007	6	15	13	3	07/11/2007	0.2	07/11/2007	3339	07/11/2007	Qpah	135771					INV
6628-23335	29/05/2007	86	124	119	0.85	07/08/2007	15	29/05/2007	1083	07/08/2007	Tomw(T1)	126377	OPR				MAR
6628-23369	14/02/2007		5	5	3	14/02/2007			5081	14/02/2007	Qpah	123217					
6628-23396	25/01/2008	2.5	4.5	4.5	3.03	25/01/2008					Qpah	141136					INV
6628-23576	05/06/2008	12	12	12	3.3	05/06/2008	0.63	05/06/2008	1252	05/06/2008	Qpah	141139					
6628-23585	15/01/2008	6.5	9	9	3.2	15/01/2008	0.4	15/01/2008	4846	15/01/2008	Qpah	139468					
6628-23765	24/02/2008	7	12	10	5.6	24/02/2008	0.3	24/02/2008			Qpah	135995					

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6628-24540	17/10/2007	12.1	12.1	12.1	3.6	17/10/2007	0.75	17/10/2007	4951	17/10/2007	Qpah	123216					
6628-24743	23/10/2008	14	23	20	4	23/10/2008	0.2	23/10/2008	2182	23/10/2008	Qpah	140476					
6628-24802	20/12/2008	7.1	10.1	10.1	7.5	20/12/2008	10	20/12/2008			Qpah	136895					INV
6628-24907			6.2	0								184370	BKF				
6628-25183	23/11/2009	14	20	20	5	23/11/2009	0.33	23/11/2009	2995	23/11/2009	Qpah	184370					
6628-25234	13/08/2007	4	4.5	4.5	3	13/08/2007					Qpah	134579					INV
6628-25235	13/08/2007	1.5	4.5	4.5	3.2	13/08/2007					Qpah	134580					INV
6628-25236	14/08/2007	1.5	4.5	4.5							Qpah	134581					INV
6628-25288	15/07/2010	7.3	8	7.3	4	15/07/2010					Qpah	190954					INV
6628-25289	15/07/2010	8	8	8	3.5	15/07/2010					Qpah	190953					INV
6628-25290	15/07/2010	7.5	8	7.5	5	15/07/2010					Qpah	190952					INV
6628-25291	13/07/2010	4.2	4.2	4.2							Qpah	190951					INV
6628-25292	13/07/2010	4	4	4							Qpah	190948					INV
6628-25336	12/11/2009	1.5	4.5	4.5	2.8	12/11/2009					Qpah	184888					INV
6628-25337	21/11/2009		4.5	0	4.2	21/11/2009					Qpah	218214	BKF				INV
6628-25338	11/11/2009		4.5	0	2.2	11/11/2009					Qpah	218207	BKF				INV
6628-25339	11/11/2009		4.5	0	2.2	11/11/2009					Qpah	218206	BKF				INV
6628-25340	11/11/2009		4.5	0	2.1	11/11/2009					Qpah	218221	BKF				INV
6628-25341	11/11/2009		4.5	0	2.2	11/11/2009					Qpah	218222	BKF				INV
6628-25342	12/11/2009		4.5	0	2.2	12/11/2009					Qpah	218218	BKF				INV
6628-25362	01/04/2010	3	5.6	5.6							Qpah	188356					INV
6628-25363	01/04/2010	3	5.5	5.5							Qpah	188357					INV
6628-25383	09/09/2010		4	0	1.5	09/09/2010					Qpah	218220	BKF				INV
6628-25384	09/09/2010		4	0							Qpah	218219	BKF				INV
6628-25424	23/12/2009	3	6	6							Qpah	185669					INV
6628-25425	23/12/2009	3	6	6							Qpah	185670					INV
6628-25427	24/06/2010	137	227	191	-1.46	03/09/2024	10	19/06/2010	1020	23/09/2014	Tomw(T2)	170282	OPR	ADE206	C	H	MON
6628-25428	28/06/2010	89	117	117	-0.27	03/09/2024	5	26/06/2010	1104	23/09/2014	Tomw(T1)	170283	OPR	ADE207	C	H	MON
6628-25644	11/11/2010	2	5	5	2.7	11/11/2010	5	11/11/2010			Qpah	197174					INV
6628-25645	11/11/2010	2	5	5	2.4	11/11/2010			1187	30/09/2014	Qpah	197175					INV
6628-25646	11/11/2010	2	5	5	3.2	11/11/2010					Qpah	197176					INV
6628-25717	03/11/2010	240	340	340	3	03/11/2010	15	02/11/2010	5580	03/11/2010	Tomw(T2)	188576	OPR				MON
6628-25718	17/10/2010	188	280	280	0	17/10/2010	15	19/10/2010	2709	17/10/2010	Tomw(T2)	188575	OPR				MAR
6628-25719	08/07/2010	161	240	224	0.81	08/07/2010	10	02/07/2010	1035	20/10/2010	Tomw(T2)	188574	OPR				MAR
6628-25775	27/05/2011	2	5.2	5.2	3.09	27/05/2011			2386	27/05/2011	Qpah	201842					INV
6628-26225	10/02/2012	1.8	4.8	4.8	2.8	10/02/2012					Qpah	209843					INV
6628-26232	04/10/2011	1	4	4	1.8	04/10/2011					Qpah	205883					INV
6628-26233	04/10/2011	1	4	4	1.8	04/10/2011					Qpah	205884					INV
6628-26234	04/10/2011		4	0	1.6	04/10/2011					Qpah	228589	BKF				INV
6628-26254	23/01/2012	2.7	5.2	5.2	2.7	23/01/2012					Qpah	209003					INV
6628-26255	23/01/2012	1.5	4.5	4.5	2.4	23/01/2012					Qpah	209004					INV
6628-26256	23/01/2012	5	5	5	2.6	23/01/2012					Qpah	209006					INV

Unit No	Date	Cased To (m)	Max Depth (m)	Latest Depth (m)	SWL (m)	SWL Date	Yield (L/sec)	Yield Date	TDS (mg/L)	TDS Date	Aquifer	Permit No	Status	Obs No	SWL Status	Salinity Status	Purpose
6628-26395	27/09/2008	78	124	110	1.94	18/08/2010	10.1	27/09/2008	1279	11/12/2018	Tomw(T1)	141144	CFL				IRR
6628-26437	03/08/2012	2.5	5.5	5.5	3.4	03/08/2012					Qpah	213539					
6628-26552	16/10/2012	2	5	5	2.7	16/10/2012					Qpah	215994					INV
6628-26553	16/10/2012	2	6	6	2.5	16/10/2012					Qpah	215993					INV
6628-26554	16/10/2012	2.5	6	6	2.2	16/10/2012					Qpah	215992					INV
6628-26587	20/07/2012	2	6	5	3	20/07/2012			3189	20/07/2012	Qpah	211986					INV
6628-26762				0								218223	BKF				
6628-26763				0								218224	BKF				
6628-26764				0								218203	BKF				
6628-26765				0								218204	BKF				
6628-26766				0								218205	BKF				
6628-26767				0								218208	BKF				
6628-26768				0								218209	BKF				
6628-26769				0								218210	BKF				
6628-26770				0								218211	BKF				
6628-26771				0								218212	BKF				
6628-26772				0								218213	BKF				
6628-26773				0								218215	BKF				
6628-26774	23/01/2013	2	5	5	4.1	23/01/2013					Qpah	218334					INV
6628-26775	23/01/2013	2	5	5	4	23/01/2013					Qpah	218335					INV
6628-26776	23/01/2013	2	5	5	4.3	23/01/2013					Qpah	218336					INV
6628-26777	24/01/2013	2	5	5	3.3	24/01/2013					Qpah	218337					INV
6628-26778	24/01/2013	2	5	5	3.1	24/01/2013					Qpah	218338					INV
6628-27002	26/05/2013	155.5	220	220	3.5	26/05/2013	30	22/05/2013	925	26/05/2013	Tomw(T2)	216519	OPR				MAR
6628-27005	29/04/2013	13	180	0							Tomw(T1)	216518	DEC				
6628-27006		18	186	0					1156	13/06/2013	Tomw(T1)	216518	DEC				
6628-27007	13/06/2013	168	234	234	2.5	13/06/2013	30	11/06/2013	2721	13/06/2013	Tomw(T2)	216518	OPR				MAR
6628-27008		93	124	124	4	15/08/2013	20	30/07/2013	1154	15/07/2019	Tomw(T1)	222001	CFL				IRR
6628-27245	16/12/2013	1	4	4	1.8	16/12/2013					Qpah	228588					INV
6628-27246	16/12/2013	1	4	4	3	16/12/2013					Qpah						INV
6628-27794	15/05/2015	57.5	70	70	1.45	18/10/2018	10	14/05/2015	1310	07/12/2023	Tomw(T1)	239990	CSH				IRR
6628-27918	03/02/2014		10	0							Qpah	229703	BKF				INV
6628-27919	04/02/2014		11	0							Qpah	229704	BKF				INV
6628-27920	04/02/2014		11	0							Qpah	229705	BKF				INV
6628-28375	26/04/2016	1	4	4							Qpah	262105					INV
6628-28376	26/04/2016	1	4	4							Qpah	262104					INV
6628-28377		1	4	4							Qpah	262103					INV
6628-28378	26/04/2016	1	4	4							Qpah	262102					INV
6628-28403	19/05/2016	3.5	3.5	3.5							Qpah	262888					INV
6628-28404	19/05/2016	2.5	7	5.5	2.2	19/05/2016					Qpah	262889					INV
6628-28708	12/10/2016	1.5	4.5	4.5	2	12/10/2016					Qpah	274258					INV
6628-28709	12/10/2016	1.5	4.5	4.5	1.5	12/10/2016					Qpah	274259					INV

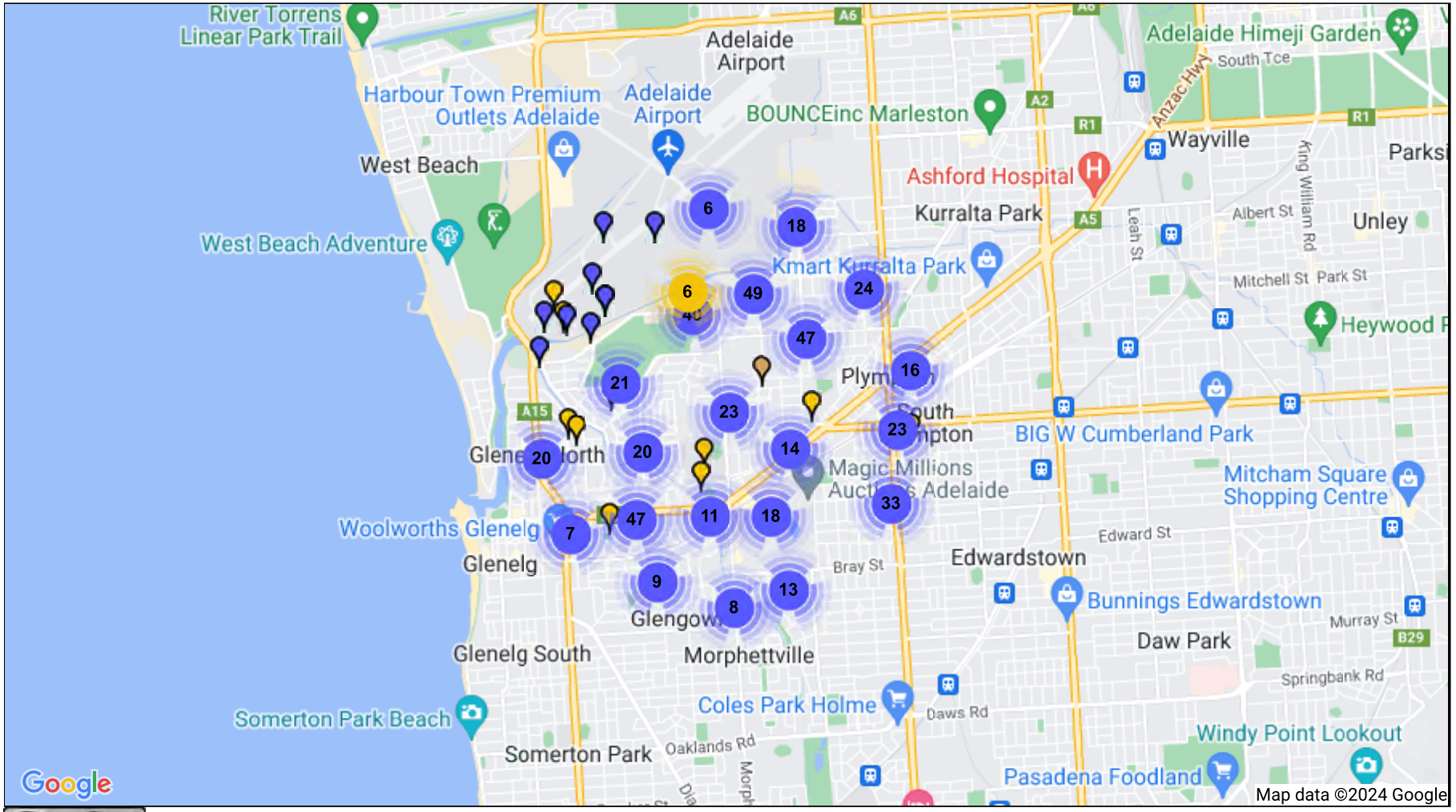
Unit No	Date	Cased To (m)	Max Depth (m)	Latest Depth (m)	SWL (m)	SWL Date	Yield (L/sec)	Yield Date	TDS (mg/L)	TDS Date	Aquifer	Permit No	Status	Obs No	SWL Status	Salinity Status	Purpose
6628-28710	12/10/2016	1.5	4.5	4.5	1.6	12/10/2016					Qpah	274260					INV
6628-28711	12/10/2016		4	0	1.8	12/10/2016					Qpah	297082	BKF				INV
6628-28732	01/03/2017	3	9	9	4	01/03/2017					Qpah	279412					MON
6628-28733	01/03/2017	3	9	9	3.2	01/03/2017					Qpah	279413					MON
6628-28734	01/03/2017	2	8	8							Qpah	279417					INV
6628-28735	02/03/2017	2	8	8							Qpah	279414					INV
6628-28736	02/03/2017	2.5	8.5	8.5							Qpah	279416					INV
6628-28797	28/07/2016	1	4	4	1.8	28/07/2016					Qpah	269227					INV
6628-28800	28/07/2016	1	4	4	0.7	28/07/2016					Qpah	269224					INV
6628-28801	28/07/2016	1	4	4	0.5	28/07/2016					Qpah	269223					INV
6628-28802	28/07/2016	2	5	5	1.8	28/07/2016					Qpah	269222					INV
6628-28895	18/07/2017	10	10	10							Qpah	285660					INV
6628-28896	18/07/2017	8	8	8							Qpah	285661					INV
6628-28897	18/07/2017	4	8	8							Qpah	285662					
6628-29043	16/08/2017		4	0							Qpah	297081	BKF				ENV
6628-29044	16/08/2017		4.5	0							Qpah	297083	BKF				ENV
6628-29253	16/08/2017		4	0							Qpah	297080	BKF				ENV
6628-29437	09/04/2018	94.5	107.5	107.5	10	09/04/2018	20	09/04/2018			Tomw(T2)	301464					
6628-29752	01/08/2018		4.5	4.5							Qpah	325977					INV
6628-29753	01/08/2018		4.5	4.5							Qpah	325978					INV
6628-29754	01/08/2018		4.5	4.5							Qpah	325979					INV
6628-29757	31/07/2018		4	4							Qhck	324577					INV
6628-29758	31/07/2018		6	6							Qhck	324578					INV
6628-29774		4.96	4.96	4.96					2852	10/12/2018	Qpah						
6628-30249																	
6628-30324			40.47	0					1474	26/08/2019		350669	BKF				
6628-30399	23/09/2019	1.3	6.5	6.5								350934					INV
6628-30400	23/09/2019	2	5	5								350935					INV
6628-30679	04/03/2020		4.5	4.5		04/03/2020						359675					INV
6628-30680	04/03/2020		5	5		04/03/2020						359677					INV
6628-30681	04/03/2020		5	5		04/03/2020						359678					INV
6628-30682	04/03/2020		5	5								359676					INV
6628-30853	24/02/2020		6	6	5	24/02/2020						360180					MON
6628-30854	24/02/2020		4.6	4.6	2.8	24/02/2020						360181					MON
6628-31353			43	43													
6628-31577	29/10/2021		5	5								408502					MON
6628-32056	01/08/2022		5	0								417792	BKF				ENV
6628-32057	01/08/2022		5	0								417793	BKF				ENV
6628-32058	01/08/2022		5	0								417794	BKF				ENV
6628-32059	08/08/2022		5	0								417796	BKF				ENV
6628-32060	08/08/2022		5	0								417795	BKF				INV
6628-32061	08/08/2022		5	0								417797	BKF				ENV

Unit No	Date	Cased To (m)	Max Depth (m)	Latest Depth (m)	SWL (m)	SWL Date	Yield (L/sec)	Yield Date	TDS (mg/L)	TDS Date	Aquifer	Permit No	Status	Obs No	SWL Status	Salinity Status	Purpose
6628-32110	26/10/2022		30	0								428651	BKF				INV
6628-32111	03/11/2022		30	0								428649	BKF				INV
6628-32112			1	0								428648	BKF				
6628-32163	20/10/2022		30	30								428932					INV
6628-32199	26/10/2022		30	30		26/10/2022						428648	DRY				INV
6628-32201	20/10/2022		30	30								428646					INV
6628-32202	09/11/2022		30	0								428858	BKF				INV
6628-32286	18/05/2022		6	6								415969					INV
6628-32287	19/05/2022		6	6								415970					INV
6628-32288	19/05/2022		7	7								415971					INV
6628-32289	19/05/2022		4.5	4.5								415972					INV
6628-32310	06/12/2022	1.5	4.5	4.5								432796					ENV
6628-32631	30/05/2023		5	5	3.2	30/05/2023						440486					MON
6628-32656	22/09/2023	84	87	0								436100	BKF				IRR
6628-32688	17/10/2023		3.5	3.5								449012					INV
6628-32689	17/10/2023		4	4								449011					INV
6628-32690	17/10/2023		3.5	3.5								449013					INV
6628-32706	26/10/2023		6	6								449412					ENV
6628-32707	24/10/2023		8	8								449409					ENV
6628-32708	24/10/2023		7.5	7.5								449410					ENV
6628-32709	25/10/2023		6	6								449411					ENV
6628-32710	25/10/2023		8	8								449407					ENV
6628-32711	26/10/2023		6	6								449408					ENV
6628-32919	27/01/2024		7	7								456145					INV
6628-32920	27/01/2024		7	7								456144					INV
6628-32921	27/01/2024		7	7								456143					INV
6628-33079	07/06/2024	1.5	5.5	5.5	1.7	07/06/2024						501767					INV
6628-33080	07/06/2024	1	5.5	5.5	1.3	07/06/2024						501768					INV
6628-33155	25/05/2024		7	7								501665					INV
6628-33156	25/05/2024		8	8								501664					INV
6628-33157	25/05/2024		7	7								501663					INV
6628-33192	05/08/2024		5	5								502597					INV
6628-33193	05/08/2024		4	4	0.7	05/08/2024						502598					INV
6628-33194	06/08/2024		4.5	4.5	1.8	06/08/2024						502599					INV
6628-33195	06/08/2024		4	4	1.9	06/08/2024						502600					INV
6628-33196	06/08/2024		4	4	1.2	06/08/2024						502601					INV
6628-33233	18/09/2024		4	4	1.4	18/09/2024						503265					INV
6628-33234	19/09/2024		4	4	1.6	19/09/2024						503264					INV

493 records

Government of South Australia WaterConnect

Circle Centre -34.966435,138.537435, Radius 2km

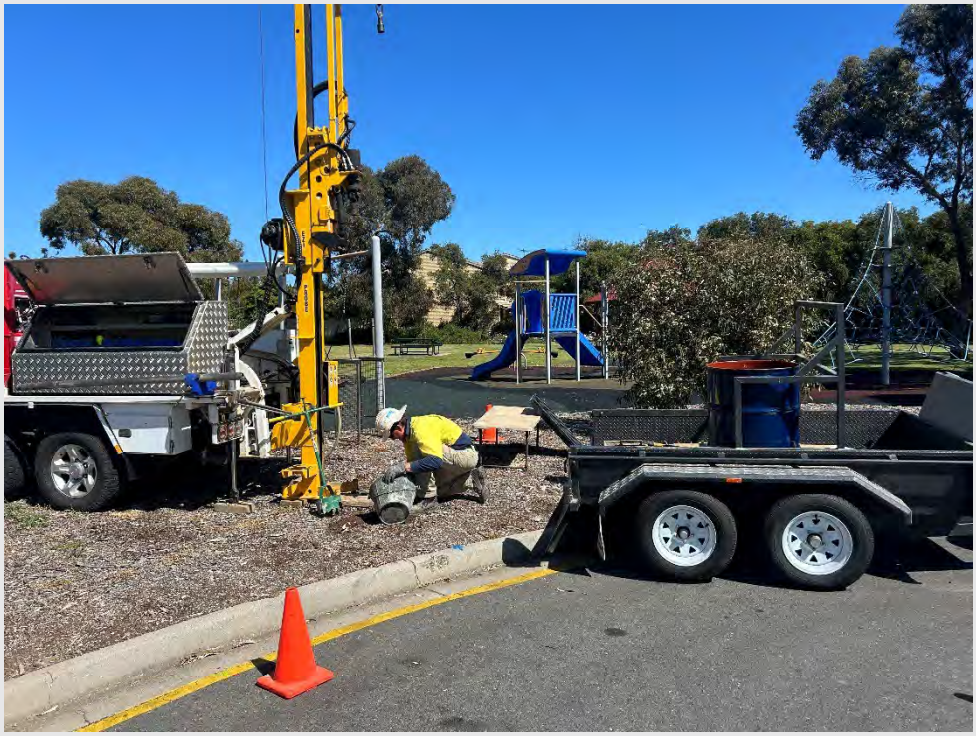


Appendix D

Photolog

Photolog
Camden Park Fire Station - Further Investigations

No.	Location/ Description	Photograph
1.	MW04 Location pre-well installation Date: 18/09/2024	
2.	MW04 Traffic setup Date: 18/09/2024	

No.	Location/ Description	Photograph
3.	MW04 Groundwater well after installation Date: 18/09/2024	
4.	MW05 Location pre-well installation Date: 18/09/2024	

No.	Location/ Description	Photograph
5.	MW05 Soil from drilling Date: 18/09/2024	
6.	MW05 Completed well Date: 18/09/2024	

No.	Location/ Description	Photograph
7.	MW06 Location before well installation Date: 19/09/2024	
8.	MW06 Traffic setup Date: 19/09/2024	

No.	Location/ Description	Photograph
9.	MW06 Traffic setup Date: 19/09/2024	
10.	MW06 Soil from drilling Date: 19/09/2024	

No.	Location/ Description	Photograph
11.	MW06 Groundwater well after installation Date: 19/09/2024	
12.	SW01 Surface water sampling directly outside MFS in stormwater pit (Albert Av.) Date: 25/09/2024	

No.	Location/ Description	Photograph
13.	SW02 Surface water sampling in Brownhill Creek stormwater inlet point Date: 25/09/2024	

Appendix E

Borelogs

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

MONITORING WELL MW04

Client SA MFS
Project MFS Camden Park - Further Contamination Investigation
Project No. 12645793
Site MFS Camden Park
Location 65 Morphett Rd
Date Drilled 18/09/2024

Drill Co. WB Drilling PTY. Ltd.
Driller WB Drilling PTY. Ltd.
Rig Type Eziprobe
Drill Method HA, PT, HFA
Total Depth (m) 3.50
Casing Diameter (mm) 50

Easting, Northing 275250.802, 6127881.125
Grid Ref GDA94_MGA_zone_54
Ground Level (m AHD) 5.874
TOC (mAHD) 5.737
Logged By CW, AV
Checked By TD

B.C.L No. P-503263 **Casing** 50 mm PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA		MW04_0.1		Bentonite		CRUSHED STONE				0
0.2							SAND fine to medium, poorly graded, brown, with fine to coarse gravel, angular to subangular, fine to coarse, poorly graded gravel (FILL)	D	VL	no odour no staining	-0.2
0.4							SAND fine to medium, pale brown, some organics, trace roots (NATURAL - SOIL)	SM	L	no odour no staining	-0.4
0.6											-0.6
0.8											-0.8
1			MW04_1.0	▽			SAND fine to medium, pale brown, some organics (NATURAL - SOIL)	M	D	weak organic odour no staining	-1
1.2											-1.2
1.4							SAND fine to medium, grey mottled orange, some clay	M	VD	no odour no staining	-1.4
1.6	PT						Clayey SAND no plasticity, fine to medium, grey mottled orange (NATURAL - SOIL)	M	VD	no odour no staining	-1.6
1.8											-1.8
2					Sand		Clayey SAND fine to medium, pale grey-brown mottled red (NATURAL - SOIL)	M	VD	no odour no staining	-2
2.2							Clayey SAND low plasticity, fine to medium, brown mottled orange (NATURAL - SOIL)	M	VD	no odour no staining	-2.2
2.4							Sandy CLAY medium plasticity, fine, pale orange- brown (NATURAL - SOIL)	M	H	no odour no staining	-2.4
2.6	HFA										-2.6
2.8											-2.8
3											-3
3.2											-3.2
3.4											-3.4
3.6							Termination Depth at:3.50 m. Target depth achieved.				-3.6

Notes

This log is not intended for geotechnical purposes. Hollow triangle symbolises water strike, solid triangle symbolises recovered water level.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, RB-Rotary Blade, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

MONITORING WELL MW05

Client SA MFS
Project MFS Camden Park - Further Contamination Investigation
Project No. 12645793
Site MFS Camden Park
Location 65 Morphett Rd
Date Drilled 18/09/2024

Drill Co. WB Drilling PTY. Ltd.
Driller WB Drilling PTY. Ltd.
Rig Type Eziprobe
Drill Method HA, PT, HFA
Total Depth (m) 4.00
Casing Diameter (mm) 50

Easting, Northing 275001.022, 6127942.667
Grid Ref GDA94_MGA_zone_54
Ground Level (m AHD) 5.696
TOC (mAHD) 5.602
Logged By CW, AV
Checked By TD

B.C.L No. P-503265 **Casing** 50 mm PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA		MW05_0.1		Bentonite		MULCH				
0.2							Silty SAND fine to medium, brown, trace fine to coarse gravel, trace roots, angular to subangular, fine to coarse gravel (FILL)	D	L	no odour	-0.2
0.4											-0.4
0.6							Silty SAND fine, pale grey	D	L	no odour no staining	-0.6
0.8							Sandy CLAY medium to high plasticity, pale grey mottled dark grey, fine sand (NATURAL - SOIL)	SM	F	no odour no staining	-0.8
1							Sandy CLAY medium to high plasticity, pale brown mottled dark grey, fine sand (NATURAL - SOIL)	SM	VST	no odour no staining	-1
1.2											-1.2
1.4			MW05_1.4	▽			CLAY high plasticity, pale orange- brown, trace roots, trace organics (NATURAL - SOIL)	M	VST	no odour no staining	-1.4
1.6	PT						CLAY high plasticity, pale orange- brown, trace organics (NATURAL - SOIL)	M	VST	no odour no staining	-1.6
1.8											-1.8
2											-2
2.2					Sand		CLAY high plasticity, pale orange- brown, with sand, fine to medium sand (NATURAL - SOIL)	M	ST	no odour no staining	-2.2
2.4							SAND fine to medium, orange- brown (NATURAL - SOIL)	W	MD	no odour no staining	-2.4
2.6	HFA										-2.6
2.8											-2.8
3											-3
3.2											-3.2
3.4											-3.4
3.6											-3.6
3.8											-3.8
4											-4
4.2							Termination Depth at:4.00 m. Target depth achieved.				-4.2
4.4											-4.4
4.6											-4.6
4.8											-4.8

Notes

This log is not intended for geotechnical purposes. Hollow triangle symbolises water strike, solid triangle symbolises recovered water level.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, RB-Rotary Blade, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

MONITORING WELL MW06

Client SA MFS
Project MFS Camden Park - Further Contamination Investigation
Project No. 12645793
Site MFS Camden Park
Location 65 Morphett Rd
Date Drilled 19/09/2024

Drill Co. WB Drilling PTY. Ltd.
Driller WB Drilling PTY. Ltd.
Rig Type Eziprobe
Drill Method HA, PT, HFA
Total Depth (m) 4.00
Casing Diameter (mm) 50

Easting, Northing 275111.030, 6128000.258
Grid Ref GDA94_MGA_zone_54
Ground Level (m AHD) 6.030
TOC (mAHD) 5.919
Logged By CW, AV
Checked By TD

B.C.L No. P-503264 **Casing** 50 mm PVC (Class 18) **Screen** 0.5mm Slotted PVC (Class 18) **Surface Completion** Gatic

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	HA		MW06_0.1		Bentonite		GRASS				-0.2
0.2							Silty SAND no plasticity, fine to medium, poorly graded, dark grey- brown, trace rootlets, trace roots (FILL)	D	L	no odour no staining	
0.4			MW06_0.5				Clayey SAND low plasticity, fine to medium, trace fine to medium gravel, trace rootlets, angular to subangular, fine to medium, poorly graded gravel (FILL)	SM	MD	no odour no staining, trace brick fragments	-0.4
0.6							CLAY medium to high plasticity, pale grey-brown, with fine to medium sand, trace rootlets, fine to medium sand (NATURAL - SOIL)	SM	F	no odour no staining	-0.6
0.8							CLAY medium to high plasticity, pale grey-brown, trace fine sand, fine sand (NATURAL - SOIL)	SM	ST	no odour no staining	-0.8
1							SAND fine to medium, dark grey mottled pale grey (NATURAL - SOIL)	M	MD	no odour no staining	-1
1.2							SAND fine to medium, pale brown mottled dark orange (NATURAL - SOIL)	M	MD	no odour no staining	-1.2
1.4	PT		MW06_1.6				Sandy CLAY medium to high plasticity, pale grey mottled pale brown, trace rootlets, trace organics, very fine sand (NATURAL - SOIL)	VM	ST	no odour no staining	-1.4
1.6							Clayey SAND low plasticity, fine, pale grey mottled dark grey (NATURAL - SOIL)	M	VST	no odour no staining	-1.6
1.8							SAND no plasticity, fine, pale green- grey mottled pale tan, some clay (NATURAL - SOIL)	M	VST	no odour no staining	-1.8
2					Sand		SAND no plasticity, fine, pale green- grey mottled orange, some clay (NATURAL - SOIL)	M	VST	no odour no staining	-2
2.2											-2.2
2.4											-2.4
2.6											-2.6
2.8							Sandy CLAY medium to high plasticity, pale brown- orange, fine to medium sand (NATURAL - SOIL)	M	VST	no odour no staining, Mottled green grey and dark orange	-2.8
3	HFA										-3
3.2											-3.2
3.4											-3.4
3.6											-3.6
3.8											-3.8
4											-4
4.2							Termination Depth at:4.00 m. Target depth achieved.				-4.2
4.4											-4.4
4.6											-4.6
4.8											-4.8

Notes

This log is not intended for geotechnical purposes. Hollow triangle symbolises water strike, solid triangle symbolises recovered water level.

Drilling Abbreviations

AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, RB-Rotary Blade, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler

Moisture Abbreviations

D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated

Consistency Abbreviations

Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense

Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Appendix F

Laboratory Reports

CERTIFICATE OF ANALYSIS

Work Order	: **EM2416252**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TOM DUNCAN	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 19-Sep-2024 12:00
Order number	: 12645793	Date Analysis Commenced	: 24-Sep-2024
C-O-C number	: ----	Issue Date	: 26-Sep-2024 14:07
Sampler	: CW		
Site	:		
Quote number	: EN/000		
No. of samples received	: 26		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231X: Poor matrix spike recovery for sample EM2416085_02 due to sample matrix interference.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW04_0.1	MW04_1.0	MW05_0.1	MW05_1.4	MW06_0.1
				Sampling date / time	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	19-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416252-001	EM2416252-003	EM2416252-007	EM2416252-010	EM2416252-017
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**2.3**	**13.3**	**9.2**	**20.1**	**11.2**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0037**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0002**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0002**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0007**
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0011**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW04_0.1	MW04_1.0	MW05_0.1	MW05_1.4	MW06_0.1
				Sampling date / time	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	19-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416252-001	EM2416252-003	EM2416252-007	EM2416252-010	EM2416252-017
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	---	0.0002	mg/kg		**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0059**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0037**
Sum of PFAS (WA DER List)	---	0.0002	mg/kg		**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0041**
EP231S: PFAS Surrogate									
13C4-PFOS	---	0.0002	%		**114**	**128**	**131**	**128**	**123**
13C8-PFOA	---	0.0002	%		**107**	**112**	**116**	**114**	**113**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW06_1.6	FD02	TB01	----	----
				Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2416252-021	EM2416252-024	EM2416252-027	--------	--------
					Result	Result	Result	---	---
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**17.2**	**15.8**	**2.5**	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW06_1.6	FD02	TB01	----	----
				Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2416252-021	EM2416252-024	EM2416252-027	--------	--------
					Result	Result	Result	---	---
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**125**	**111**	**111**	----	----
13C8-PFOA	----	0.0002	%		**110**	**116**	**114**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB01	RB02	----	----	----
				Sampling date / time	18-Sep-2024 00:00	19-Sep-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2416252-016	EM2416252-026	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB01	RB02	----	----	----
				Sampling date / time	18-Sep-2024 00:00	19-Sep-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2416252-016	EM2416252-026	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**102**	**101**	----	----	----
13C8-PFOA	----	0.02	%		**96.3**	**98.3**	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	68	136
13C8-PFOA	----	69	133

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2418759**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TOM DUNCAN	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 19-Sep-2024
Site	:	Issue Date	: 30-Oct-2024
Sampler	: CW	No. of samples received	: 1
Order number	: 12645793	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EM2418746--003	Anonymous	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Days overdue	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Days overdue
EA055: Moisture Content (Dried @ 105-110°C)						
HDPE Soil Jar						
MW06_0.5	----	----	----	29-Oct-2024	03-Oct-2024	**26**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Extraction / Preparation: Due for extraction	Extraction / Preparation: Evaluation	Analysis: Date analysed	Analysis: Due for analysis	Analysis: Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055)							
MW06_0.5	**19-Sep-2024**	**----**	----	**----**	**29-Oct-2024**	03-Oct-2024	×
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X)							
MW06_0.5	**19-Sep-2024**	**29-Oct-2024**	18-Mar-2025	✓	**29-Oct-2024**	08-Dec-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X)							
MW06_0.5	**19-Sep-2024**	**29-Oct-2024**	18-Mar-2025	✓	**29-Oct-2024**	08-Dec-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X)							
MW06_0.5	**19-Sep-2024**	**29-Oct-2024**	18-Mar-2025	✓	**29-Oct-2024**	08-Dec-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X)							
MW06_0.5	**19-Sep-2024**	**29-Oct-2024**	18-Mar-2025	✓	**29-Oct-2024**	08-Dec-2024	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) MW06_0.5	**19-Sep-2024**	**29-Oct-2024**	18-Mar-2025	✓	**29-Oct-2024**	08-Dec-2024	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.

QUALITY CONTROL REPORT

Work Order	: **EM2418759**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TOM DUNCAN	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 19-Sep-2024
Order number	: 12645793	Date Analysis Commenced	: 29-Oct-2024
C-O-C number	: ----	Issue Date	: 30-Oct-2024
Sampler	: CW		
Site	:		
Quote number	: EN/000		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 6152717)									
EM2418759-001	MW06_0.5	EA055: Moisture Content	----	0.1	%	17.0	16.3	4.3	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6152651)									
EM2418746-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0026	0.0024	10.3	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0239	0.0286	18.0	0% - 20%
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6152651)									
EM2418746-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0002	0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0002	0.0003	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0002	0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 6152651)									
EM2418746-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 6152651)									
EM2418746-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 6152651)									
EM2418746-001	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0275	0.0321	15.4	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0265	0.0310	15.7	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0269	0.0315	15.8	0% - 20%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6152651)								
EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.0005	mg/kg	<0.0005	0.00125 mg/kg	80.5	70.0	130
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	92.6	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	93.8	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	89.7	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	98.3	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	90.3	68.0	136
EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.3	69.0	125
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	87.0	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6152651)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	91.5	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.2	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.6	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.8	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.5	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.5	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.9	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.0	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	100	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.0	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6152651)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.6	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	92.7	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	92.5	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	91.7	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.3	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.5	61.0	139

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6152651)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	96.7	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00119 mg/kg	90.8	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	92.2	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00121 mg/kg	114	70.0	130
EP231P: PFAS Sums (QCLot: 6152651)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6152651)							
EM2418746-003	Anonymous	EP231X: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.00125 mg/kg	78.8	70.0	130
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	79.3	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	82.9	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	89.2	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	87.3	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	# Not Determined	68.0	136
		EP231X: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.00125 mg/kg	86.0	69.0	125
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00121 mg/kg	108	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6152651)							
EM2418746-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	85.0	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	80.0	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	75.9	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	78.2	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	85.7	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	85.5	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	83.8	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	85.8	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	88.7	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	86.2	66.0	139

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6152651) - continued							
EM2418746-003	Anonymous	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	92.6	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6152651)							
EM2418746-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	82.0	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	89.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	80.9	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	78.0	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	84.1	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	101	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	86.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6152651)							
EM2418746-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	87.8	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00119 mg/kg	69.0	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	85.0	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00121 mg/kg	80.2	70.0	130

REBATCH REQUEST

Workorder / Client code / Project:	ALS Workorder EM2416252, Client GHDSER, Project 12645793, Overall Description Carden Park Fire Station - Further Investigation	**CS Contact: Peter Ravlic**	
Project Manager:	***Please include this rebatch PM plus all report recipients as per original workorder***	Additional Information:	
Date samples rec'd:	19/09/2024 12:30		
Date Instructions rec'd:	29/10/2024 14:18		
Rebatch due date:	Wednesday, 30 October 2024	FTAT approved?	NO
Due date surcharge:	**1 DAY**		

	Sample information							Analysis									
								Standard					Leach				
New Lab ID	Client ID	Sampling Date / Time	Previous Work Order Reference	Previous ALS ID	Tray Number(s)	Container	Managed Moisture	**PFAS long suite (EP231X)**									**Shortest Holding time expiry**
J	MW06_0.5	19/09/2024 0:00	EM2416252	18	MS: 6344-6345, MPS: 609	Soil HDPE		X									
							TOTAL										

Environmental Division
Melbourne
Work Order Reference
EM2418759

Telephone : + 61-3-8549 9600

Ciara Barr

From: Tom Duncan <Thomas.Duncan@ghd.com>
Sent: Tuesday, 29 October 2024 2:18 PM
To: Peter Ravlic
Cc: Ben Petticrew; Chelsea Wright
Subject: [EXTERNAL] - EM2416252 samples

Hi Peter,

Just checking to see if you still have the sample ID MW06_0.5 on hold? If so could you please analyse this for the PFAS soil suite (same as the other samples) on a quick turnaround?

Any questions please let me know

Thanks

Tom Duncan (he/him)
B. Engineering (Environmental) (Hons)
Senior Environmental Engineer

GHD
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D 61 0 8687 8327 **M** 61 413 476 581 **E** Tom.Duncan@ghd.com

CERTIFICATE OF ANALYSIS

Work Order	: **EM2417598**	Page	: 1 of 13
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: Tom Duncan	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 11-Oct-2024 12:10
Order number	: ----	Date Analysis Commenced	: 11-Oct-2024
C-O-C number	: ----	Issue Date	: 18-Oct-2024 14:36
Sampler	: TW/AV		
Site	:		
Quote number	: EN/000		
No. of samples received	: 9		
No. of samples analysed	: 9		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417598-001	EM2417598-002	EM2417598-003	EM2417598-004	EM2417598-005
					Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	----	----	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	----	----	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	----	----	**991**	----
Total Alkalinity as CaCO3	----	1	mg/L		----	----	----	**991**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	----	----	**419**	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		----	----	----	**862**	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		----	----	----	**21**	----
Magnesium	7439-95-4	1	mg/L		----	----	----	**41**	----
Sodium	7440-23-5	1	mg/L		----	----	----	**1270**	----
Potassium	7440-09-7	1	mg/L		----	----	----	**17**	----
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		----	----	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L		----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	<0.005	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	----	----	**0.001**	----
Cadmium	7440-43-9	0.0001	mg/L		----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L		----	----	----	**0.001**	----
Copper	7440-50-8	0.001	mg/L		----	----	----	**0.001**	----
Nickel	7440-02-0	0.001	mg/L		----	----	----	**0.002**	----

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	MW01	MW02	MW03	MW04	MW05
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
					EM2417598-001	EM2417598-002	EM2417598-003	EM2417598-004	EM2417598-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Lead	7439-92-1	0.001	mg/L		----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	**0.012**	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	----	<0.01	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	----	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	----	**0.06**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	----	**0.06**	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		----	----	----	**52.8**	----
ø Total Cations	----	0.01	meq/L		----	----	----	**60.1**	----
ø Ionic Balance	----	0.01	%		----	----	----	**6.43**	----
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002	µg/L		**0.009**	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002	µg/L		**0.016**	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002	µg/L		**0.066**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002	µg/L		**0.005**	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L		**0.153**	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.002	µg/L		<0.002	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417598-001	EM2417598-002	EM2417598-003	EM2417598-004	EM2417598-005
					Result	Result	Result	Result	Result
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.01	µg/L		**0.01**	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002	µg/L		**0.006**	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.002	µg/L		**0.032**	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002	µg/L		<0.002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L		**0.003**	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L		<0.002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L		<0.002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L		<0.002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L		<0.002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.002	µg/L		<0.002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L		<0.005	----	----	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L		<0.002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L		<0.005	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L		<0.005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.005	µg/L		<0.005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L		<0.005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L		<0.002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L		<0.002	----	----	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417598-001	EM2417598-002	EM2417598-003	EM2417598-004	EM2417598-005
					Result	Result	Result	Result	Result
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L		<0.005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L		<0.005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L		<0.005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L		<0.005	----	----	----	----
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.002	µg/L		**0.300**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.002	µg/L		**0.219**	----	----	----	----
^ **Sum of TOP C4 - C14 as Fluorine**	----	0.002	µg/L		**0.191**	----	----	----	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.002	µg/L		**0.300**	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		**0.0092**	**0.0035**	**0.0809**	**0.0021**	**0.0019**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		**0.0081**	**0.0013**	**0.0820**	**0.0009**	<0.0005
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0593**	**0.0040**	**0.325**	**0.0043**	**0.0019**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		**0.0035**	<0.0005	**0.0114**	<0.0005	<0.0005
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L		**0.178**	**0.0071**	**0.0439**	**0.0012**	**0.0017**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.0020	µg/L		**0.0032**	<0.0020	**0.0236**	<0.0020	<0.0020
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		**0.0009**	<0.0005	**0.0221**	<0.0005	<0.0005
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		**0.0006**	<0.0005	**0.0143**	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		**0.0032**	**0.0006**	**0.0847**	**0.0009**	<0.0005

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417598-001	EM2417598-002	EM2417598-003	EM2417598-004	EM2417598-005
					Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		**0.0024**	<0.0005	**0.0118**	**0.0019**	<0.0005
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.001	**0.005**	<0.001	<0.001	<0.001
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417598-001	EM2417598-002	EM2417598-003	EM2417598-004	EM2417598-005
					Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
EP231P: PFAS Sums									
^ **Sum of PFHxS and PFOS**	355-46-4/1763-23-1	0.0002	µg/L		**0.237**	**0.0111**	**0.369**	**0.0055**	**0.0036**
^ **Sum of PFAS (WA DER List)**	----	0.0002	µg/L		**0.257**	**0.0202**	**0.606**	**0.0104**	**0.0055**
^ **Sum of PFAS**	----	0.0002	µg/L		**0.272**	**0.0237**	**0.729**	**0.0113**	**0.0055**
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.002	%		**100**	**----**	**----**	**----**	**----**
13C8-PFOA	----	0.002	%		**97.9**	**----**	**----**	**----**	**----**
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**106**	**92.6**	**107**	**88.5**	**111**
13C8-PFOA	----	0.0005	%		**105**	**98.2**	**103**	**84.2**	**103**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	FD01	FB01	RB01	----
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	----
Compound	CAS Number	LOR	Unit		EM2417598-006	EM2417598-007	EM2417598-008	EM2417598-009	--------
					Result	Result	Result	Result	----
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002	µg/L		**0.007**	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002	µg/L		**0.002**	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002	µg/L		**0.010**	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002	µg/L		<0.002	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L		<0.002	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.002	µg/L		<0.002	----	----	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.01	µg/L		<0.01	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002	µg/L		<0.002	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.002	µg/L		<0.002	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002	µg/L		<0.002	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L		<0.002	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L		<0.002	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L		<0.002	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L		<0.002	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L		<0.002	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.002	µg/L		<0.002	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L		<0.005	----	----	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L		<0.002	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L		<0.005	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	FD01	FB01	RB01	----
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	----
Compound	CAS Number	LOR	Unit		EM2417598-006	EM2417598-007	EM2417598-008	EM2417598-009	--------
					Result	Result	Result	Result	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L		<0.005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.005	µg/L		<0.005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L		<0.005	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L		<0.002	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L		<0.002	----	----	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L		<0.005	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L		<0.005	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L		<0.005	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L		<0.005	----	----	----	----
EP231_TOP_P: PFAS Sums									
Sum of PFAS	----	0.002	µg/L		**0.019**	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.002	µg/L		**0.010**	----	----	----	----
^ Sum of TOP C4 - C14 as Fluorine	----	0.002	µg/L		**0.011**	----	----	----	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.002	µg/L		**0.019**	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		**0.0046**	**0.0080**	<0.0005	<0.0005	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		**0.0015**	**0.0070**	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		**0.0065**	**0.0526**	<0.0005	<0.0005	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	FD01	FB01	RB01	----
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	----
Compound	CAS Number	LOR	Unit		EM2417598-006	EM2417598-007	EM2417598-008	EM2417598-009	--------
					Result	Result	Result	Result	----
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		<0.0005	**0.0030**	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L		**0.0020**	**0.162**	<0.0002	<0.0002	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0005	<0.0005	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.0020	µg/L		<0.0020	**0.0028**	<0.0020	<0.0020	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L		<0.0005	**0.0008**	<0.0005	<0.0005	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L		<0.0005	**0.0006**	<0.0005	<0.0005	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L		<0.0005	**0.0028**	<0.0005	<0.0005	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L		<0.0005	**0.0020**	<0.0005	<0.0005	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L		<0.0005	<0.0005	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L		<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L		<0.001	<0.001	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L		<0.001	<0.001	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L		<0.001	<0.001	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L		<0.001	<0.001	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	FD01	FB01	RB01	----
				Sampling date / time	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	----
Compound	CAS Number	LOR	Unit		EM2417598-006	EM2417598-007	EM2417598-008	EM2417598-009	--------
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L		<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L		<0.0005	<0.0005	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	----
EP231P: PFAS Sums									
^ **Sum of PFHxS and PFOS**	355-46-4/1763-23-1	0.0002	µg/L		**0.0085**	**0.215**	<0.0002	<0.0002	----
^ **Sum of PFAS (WA DER List)**	----	0.0002	µg/L		**0.0131**	**0.232**	<0.0002	<0.0002	----
^ **Sum of PFAS**	----	0.0002	µg/L		**0.0167**	**0.245**	----	----	----
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.002	%		**110**	----	----	----	----
13C8-PFOA	----	0.002	%		**100**	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		**107**	**101**	**81.0**	**80.6**	----
13C8-PFOA	----	0.0005	%		**107**	**93.7**	**80.8**	**81.6**	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231_TOP_S: PFAS Surrogate			
13C4-PFOS	----	70	130
13C8-PFOA	----	70	130
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130
13C8-PFOA	----	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2417598**	Page	: 1 of 8
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: Tom Duncan	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 11-Oct-2024
Site	:	Issue Date	: 18-Oct-2024
Sampler	: TW/AV	No. of samples received	: 9
Order number	: ----	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	11	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Chloride by Discrete Analyser	ED045G	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	11	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / ***Container*** / Client Sample ID(s)	***Sample Date***	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
MW04	**09-Oct-2024**	**----**	----	----	**15-Oct-2024**	23-Oct-2024	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
MW04	**09-Oct-2024**	**----**	----	----	**11-Oct-2024**	06-Nov-2024	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
MW04	**09-Oct-2024**	**----**	----	----	**11-Oct-2024**	06-Nov-2024	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
MW04	**09-Oct-2024**	**----**	----	----	**17-Oct-2024**	06-Nov-2024	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
MW04	**09-Oct-2024**	**----**	----	----	**17-Oct-2024**	07-Apr-2025	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
MW04	**09-Oct-2024**	**16-Oct-2024**	07-Apr-2025	✓	**16-Oct-2024**	07-Apr-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
MW04	**09-Oct-2024**	**----**	----	----	**17-Oct-2024**	06-Nov-2024	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
MW04	**09-Oct-2024**	**----**	----	**----**	**15-Oct-2024**	06-Nov-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
MW04	**09-Oct-2024**	**----**	----	**----**	**16-Oct-2024**	06-Nov-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
MW04	**09-Oct-2024**	**----**	----	**----**	**11-Oct-2024**	11-Oct-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
MW04	**09-Oct-2024**	**----**	----	**----**	**16-Oct-2024**	06-Nov-2024	✓
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X-LL (TOP))							
MW01, MW06	**09-Oct-2024**	**16-Oct-2024**	07-Apr-2025	✓	**16-Oct-2024**	07-Apr-2025	✓
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-LL (TOP))							
MW01, MW06	**09-Oct-2024**	**16-Oct-2024**	07-Apr-2025	✓	**16-Oct-2024**	07-Apr-2025	✓
EP231_TOP_C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-LL (TOP))							
MW01, MW06	**09-Oct-2024**	**16-Oct-2024**	07-Apr-2025	✓	**16-Oct-2024**	07-Apr-2025	✓
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-LL (TOP))							
MW01, MW06	**09-Oct-2024**	**16-Oct-2024**	07-Apr-2025	✓	**16-Oct-2024**	07-Apr-2025	✓
EP231_TOP_P: PFAS Sums							
HDPE (no PTFE) (EP231X-LL (TOP))							
MW01, MW06	**09-Oct-2024**	**16-Oct-2024**	07-Apr-2025	✓	**16-Oct-2024**	07-Apr-2025	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X-SUT)							
MW01, MW02, MW03, MW04, MW05, MW06, FD01, FB01, RB01	**09-Oct-2024**	**14-Oct-2024**	07-Apr-2025	✓	**14-Oct-2024**	07-Apr-2025	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X-SUT)							
MW01, MW02, MW03, MW04, MW05, MW06, FD01, FB01, RB01	**09-Oct-2024**	**14-Oct-2024**	07-Apr-2025	✓	**14-Oct-2024**	07-Apr-2025	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X-SUT)							
MW01, MW02, MW03, MW04, MW05, MW06, FD01	**09-Oct-2024**	**14-Oct-2024**	07-Apr-2025	✓	**14-Oct-2024**	07-Apr-2025	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X-SUT)							
MW01, MW02, MW03, MW04, MW05, MW06, FD01, FB01, RB01	**09-Oct-2024**	**14-Oct-2024**	07-Apr-2025	✓	**14-Oct-2024**	07-Apr-2025	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X-SUT)							
MW01, MW02, MW03, MW04, MW05, MW06, FD01, FB01, RB01	**09-Oct-2024**	**14-Oct-2024**	07-Apr-2025	✓	**14-Oct-2024**	07-Apr-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	1	**100.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	11	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
PFAS by LCMSMS after SPE and oxidation (TOP)	EP231X-LL (TOP)	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	1	**200.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PFAS by LCMSMS after SPE and oxidation (TOP)	EP231X-LL (TOP)	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	3	**66.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	1	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
PFAS by LCMSMS after SPE and oxidation (TOP)	EP231X-LL (TOP)	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	0	1	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	11	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)
PFAS by LCMSMS after SPE and oxidation (TOP)	EP231X-LL (TOP)	WATER	In-house: Analysis of fresh and saline waters by solid phase extraction followed by oxidation per Houtz, Erika F.; Sedlak, David L. (2012): Oxidative Conversion as a Means of Detecting Precursors to Perfluoroalkyl Acids in Urban Runoff. In Environmental Science & Technology 46 (17), pp. 9342¿9349. Sample extracts are analysed by LC-Electrospray-MS-MS, Negative Mode using MRM. Where commercially available, isotopically labelled analogues of the target analytes are used as internal standards for quantification. Where a labelled analogue is not commercially available, the internal standard with similar chemistry and the closest retention time to the target is used for quantification. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is concentrated, combined with an equal volume of reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Total Oxidisable Precuror Digest for PFAS - Low Level	ORG70-SPE	WATER	In-House SPE followed by oxidation per Houtz, Erika F.; Sedlak, David L. (2012): Oxidative Conversion as a Means of Detecting Precursors to Perfluoroalkyl Acids in Urban Runoff. In Environmental Science & Technology 46 (17), pp. 9342¿9349: A 50 mL sample is concentrated by SPE, taken to near dryness and made up to 5 mL in a reagent solution. The sample is digested with persulfate under alkaline conditions, neutralised and prepared for analysis per EP231.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

QUALITY CONTROL REPORT

Work Order	: **EM2417598**	Page	: 1 of 10
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: Tom Duncan	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 11-Oct-2024
Order number	: ----	Date Analysis Commenced	: 11-Oct-2024
C-O-C number	: ----	Issue Date	: 18-Oct-2024
Sampler	: TW/AV		
Site	:		
Quote number	: EN/000		
No. of samples received	: 9		
No. of samples analysed	: 9		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Eric Chau	Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 6117033)									
EM2417604-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	594	590	0.6	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	594	590	0.6	0% - 20%
EM2417603-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1200	1220	1.6	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	1200	1220	1.6	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6115102)									
EM2417598-004	MW04	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	419	428	2.3	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6115104)									
EM2417598-004	MW04	ED045G: Chloride	16887-00-6	1	mg/L	862	860	0.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6125837)									
EM2417599-010	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	15	14	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	11	11	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	80	79	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EM2417575-007	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	11	11	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	10	10	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	55	55	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	12	12	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6125838)									

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6125838) - continued									
EM2417599-011	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.025	0.024	5.7	No Limit
EM2417575-007	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.038	0.039	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 6123507)									
EM2417569-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.001	58.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EM2417598-004	MW04	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.012	0.007	48.9	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6125839)									
EM2417599-011	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2417575-007	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 6119697)									
EM2417570-003	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2417593-012	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6120196)									
EM2417555-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6120196) - continued									
EM2417605-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	33.9	35.0	3.3	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6115103)									
EM2417598-004	MW04	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6120195)									
EM2417555-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2417605-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6122168)									
EM2417598-001	MW01	EP231X-LL: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002	µg/L	0.009	0.010	0.0	No Limit
		EP231X-LL: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002	µg/L	0.016	0.012	33.2	No Limit
		EP231X-LL: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002	µg/L	0.066	0.068	2.8	0% - 20%
		EP231X-LL: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002	µg/L	0.005	0.006	19.7	No Limit
		EP231X-LL: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L	0.153	0.164	6.9	0% - 20%
		EP231X-LL: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.002	µg/L	<0.002	<0.002	0.0	No Limit
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6122168)									
EM2417598-001	MW01	EP231X-LL: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002	µg/L	0.006	0.006	0.0	No Limit
		EP231X-LL: Perfluorohexanoic acid (PFHxA)	307-24-4	0.002	µg/L	0.032	0.030	4.5	0% - 50%
		EP231X-LL: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L	0.003	0.004	0.0	No Limit
		EP231X-LL: Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: Perfluorobutanoic acid (PFBA)	375-22-4	0.01	µg/L	0.01	0.01	0.0	No Limit
EP231_TOP_C: Perfluoroalkyl Sulfonamides (QC Lot: 6122168)									
EM2417598-001	MW01	EP231X-LL: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L	<0.005	<0.005	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231_TOP_C: Perfluoroalkyl Sulfonamides (QC Lot: 6122168) - continued									
EM2417598-001	MW01	EP231X-LL: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L	<0.005	<0.005	0.0	No Limit
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 6122168)									
EM2417598-001	MW01	EP231X-LL: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L	<0.005	<0.005	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 6117033)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	97.9	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6115102)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	500 mg/L	106	90.0	110
				<1	25 mg/L	106	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 6115104)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	98.4	90.0	110
				<1	10 mg/L	98.5	90.0	110
ED093F: Dissolved Major Cations (QCLot: 6125837)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	93.1	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.4	80.0	120
EG020F: Dissolved Metals by ICP-MS (QCLot: 6125838)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.3	89.0	111
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.4	83.5	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.5	83.2	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.8	83.1	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.9	84.6	108
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.0	84.3	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	101	86.3	112
EG020T: Total Metals by ICP-MS (QCLot: 6123507)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	89.2	110
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	91.6	86.4	115
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	100	89.0	112
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	99.8	88.3	111
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.0	88.3	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.6	88.8	113
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	103	90.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 6125839)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.5	71.6	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6119697)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	101	73.4	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6120196)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6115103)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	95.0	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6120195)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	90.0	110
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids (QCLot: 6122168)								
EP231X-LL: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002	µg/L	<0.002	0.475 µg/L	106	44.9	136
EP231X-LL: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L	<0.002	0.465 µg/L	90.1	33.2	116
EP231X-LL: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.002	µg/L	<0.002	----	----	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids (QCLot: 6122168)								
EP231X-LL: Perfluorobutanoic acid (PFBA)	375-22-4	0.01	µg/L	<0.01	----	----	----	----
EP231X-LL: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorohexanoic acid (PFHxA)	307-24-4	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L	<0.002	0.5 µg/L	86.3	47.0	123
EP231X-LL: Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L	<0.005	----	----	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides (QCLot: 6122168)								
EP231X-LL: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L	<0.005	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231_TOP_C: Perfluoroalkyl Sulfonamides (QCLot: 6122168) - continued								
EP231X-LL: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L	<0.002	----	----	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6122168)								
EP231X-LL: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L	<0.005	0.05 µg/L	19.8	0	200
EP231X-LL: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L	<0.005	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6116094)								
EP231X-SUT: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	100	72.0	130
EP231X-SUT: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	99.6	71.0	127
EP231X-SUT: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	90.7	68.0	131
EP231X-SUT: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	93.9	69.0	134
EP231X-SUT: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L	<0.0002	0.00371 µg/L	96.2	65.0	140
EP231X-SUT: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	97.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6116094)								
EP231X-SUT: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.0020	0.02 µg/L	95.9	73.0	129
EP231X-SUT: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	99.2	72.0	129
EP231X-SUT: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	95.2	72.0	129
EP231X-SUT: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	97.1	72.0	130
EP231X-SUT: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	96.6	71.0	133
EP231X-SUT: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	108	69.0	130
EP231X-SUT: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	93.5	71.0	129
EP231X-SUT: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	98.3	69.0	133
EP231X-SUT: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	107	72.0	134
EP231X-SUT: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	114	65.0	144
EP231X-SUT: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	107	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6116094)								
EP231X-SUT: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	93.0	67.0	137
EP231X-SUT: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	112	68.0	141
EP231X-SUT: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	87.0	70.0	130
EP231X-SUT: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	92.8	70.0	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6116094) - continued								
EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	0.01 µg/L	90.0	70.0	130
EP231X-SUT: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	0.004 µg/L	104	65.0	136
EP231X-SUT: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	0.004 µg/L	92.3	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6116094)								
EP231X-SUT: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	0.00374 µg/L	93.5	63.0	143
EP231X-SUT: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	<0.001	0.0038 µg/L	139	64.0	140
EP231X-SUT: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	0.00384 µg/L	91.6	67.0	138
EP231X-SUT: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	0.00386 µg/L	114	70.0	130
EP231P: PFAS Sums (QCLot: 6116094)								
EP231X-SUT: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	µg/L	<0.0002	----	----	----	----
EP231X-SUT: Sum of PFAS (WA DER List)	----	0.0002	µg/L	<0.0002	----	----	----	----
EP231X-SUT: Sum of PFAS	----	0.0002	µg/L	<0.0002	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6115102)							
EM2417590-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	82.3	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 6125838)							
EM2417575-007	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	91.6	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	94.8	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	97.1	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	90.5	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	92.6	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	91.6	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	94.8	75.0	131
EG020T: Total Metals by ICP-MS (QCLot: 6123507)							
EM2417569-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	105	82.0	123
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	95.8	81.8	123

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020T: Total Metals by ICP-MS (QCLot: 6123507) - continued							
EM2417569-002	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	104	78.9	119
		EG020A-T: Copper	7440-50-8	1 mg/L	102	80.4	118
		EG020A-T: Lead	7439-92-1	1 mg/L	100	80.5	121
		EG020A-T: Nickel	7440-02-0	1 mg/L	102	80.0	118
		EG020A-T: Zinc	7440-66-6	1 mg/L	105	74.0	120
EG035F: Dissolved Mercury by FIMS (QCLot: 6125839)							
EM2417575-008	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	90.9	70.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6119697)							
EM2417570-004	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	102	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6120196)							
EM2417566-001	Anonymous	EK055G: Ammonia as N	7664-41-7	10 mg/L	95.7	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6115103)							
EM2417590-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	94.6	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6120195)							
EM2417553-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	105	70.0	130

CHAIN OF CUSTODY

FREIGHT

Page 1 of 1

Mandatory Fields

CLIENT CODE: 12645793
*PROJECT MANAGER: TOM DUNCAN
SAMPLER: TW/AV
*CLIENT: GHD
*PM MOBILE: 0413 476 581
SAMPLER MOBILE: 0467 034 756
CoC #: (if applicable)
OFFICE: (Invoiced Office) GHD ADELAIDE
ALS QUOTE # (Client PL if blank)
PURCHASE ORDER NO.:
PROJECT NO./PROJECT: 12645793 MFS CAMDEN PARK SUPP. DSI
SITE:
*INVOICE TO: (client default if nil) accountspayableAU@ghd.com.
☑ CC Invoice to PM
BIOSECURITY
Country of Origin: (if not Australia)
*EMAIL REPORTS TO: (default to PM if blank) Thomas.Duncan@ghd.com; AngelicaMaria.VilladoMeza@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com

*** STORAGE REQUIREMENTS** Please check box. → Standard Storage time from receipt of samples: Waters - 3 weeks, Soils - 2 months
☑ Standard Storage
☐ Extended Storage
Specify Disposal Date:
Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** Please check box. → (Not all tests can be expedited, contact Client Services for more information)
☑ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Environmental Division Melbourne
Work Order Reference
EM2417598
Telephone : + 61-3-8549 9600

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	Super PFAS Extended Suite (Ultra-trace PFOS)	PFAS TOPA (Low level)	NITRATE, NITRITE, AMMONIA	8 METALS (TOTAL)	8 METALS (DISSOLVED)	MAJOR CATIONS + ANIONS	Super PFAS SHORT SUITE (ULTRA-TRACE PFOS)						Lab QC (additional bottles req.) Dup	Lab QC MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
1	MW01	-	09/10/24	4	W	X	X											☐	☐	
2	MW02	-	09/10/24	2	W	X												☐	☐	
3	MW03	-	09/10/24	2	W	X												☐	☐	
4	MW04	-	09/10/24	6	W	X		X	X	X	X							☐	☐	
5	MW05	-	09/10/24	3	W	X												☐	☐	PLACE MAJOR CATIONS+ ANIONS SAMPLE ON HOLD
6	MW06	-	09/10/24	4	W	X	X											☐	☐	
7	FD01	-	09/10/24	2	W	X												☐	☐	
→	FS01	-	09/10/24	2	W	X												☐	☐	PLEASE FORWARD TO EUROFINS
8	FB01	-	09/10/24	2	W							X						☐	☐	
9	RB01	-	09/10/24	2	W							X						☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted; Ice Bricks: Frozen / Thawed; None
Sample Temp at Receipt: 25.1 °C
Security Seal Intact (circle): Yes / No / NA(None)
Carrier Details: ☐ Courier/Post ☐ Client
Con Note #
Packaging: (Circle) Hard Esky, Foam Esky, Box/Bag/Other
Count # # #

Relinquished by:	TERRENCE WILSON	Signature:	Date/Time: 09/10/24 16:15	Received by:	K. BOWENS	Signature	Date/Time: 9/10/24 4.30pm
Relinquished by:	P. MUNRO	Signature:	Date/Time: 10-10-24 1600	Received by:		Signature	Date/Time: 11/10 12:10

CERTIFICATE OF ANALYSIS

Work Order	: **EM2416582**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: Tom Duncan	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 25-Sep-2024 15:30
Order number	: ----	Date Analysis Commenced	: 27-Sep-2024
C-O-C number	: ----	Issue Date	: 02-Oct-2024 15:17
Sampler	: TW/JA		
Site	: MFS CAMDEN PARK SUPP DSI		
Quote number	: EN/000		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- It is recognised that total metals is less than dissolved metals for samples EM2416582 #2 and #3 However, the difference is within experimental variation of the methods.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.

Analytical Results

Sub-Matrix: WATER
(Matrix: WATER)

Compound	CAS Number	LOR	Unit	Sample ID	SW_MYDRANT	SW01	SW02	FB01	RB01
				Sampling date / time	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00
					EM2416582-001	EM2416582-002	EM2416582-003	EM2416582-004	EM2416582-005
					Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	<0.001	**0.002**	----	----
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		----	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		----	**0.009**	**0.002**	----	----
Nickel	7440-02-0	0.001	mg/L		----	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		----	<0.001	**0.001**	----	----
Zinc	7440-66-6	0.005	mg/L		----	**0.008**	**0.033**	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		----	<0.001	**0.002**	----	----
Cadmium	7440-43-9	0.0001	mg/L		----	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		----	**0.003**	**0.003**	----	----
Copper	7440-50-8	0.001	mg/L		----	**0.019**	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L		----	**0.002**	**0.001**	----	----
Lead	7439-92-1	0.001	mg/L		----	**0.006**	**0.002**	----	----
Zinc	7440-66-6	0.005	mg/L		----	**0.005**	**0.030**	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0001	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	<0.0001	<0.0001	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	**0.04**	**0.26**	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	<0.01	**0.02**	----	----
Nitrite as NO2	14797-65-0	0.05	mg/L		----	<0.05	**0.06**	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	**0.02**	**0.04**	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW_MYDRANT	SW01	SW02	FB01	RB01
				Sampling date / time	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416582-001	EM2416582-002	EM2416582-003	EM2416582-004	EM2416582-005
					Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser - Continued									
Nitrite + Nitrate as N	----	0.01	mg/L		**----**	**0.02**	**0.06**	**----**	**----**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	<0.01	**0.02**	<0.01	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	**0.02**	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	<0.05	**----**	**----**
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	<0.02	**----**	**----**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW_MYDRANT	SW01	SW02	FB01	RB01
				Sampling date / time	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00	25-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416582-001	EM2416582-002	EM2416582-003	EM2416582-004	EM2416582-005
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	<0.05	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	<0.02	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	<0.02	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	**0.04**	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	**0.04**	<0.01	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	**0.04**	<0.01	<0.01
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**97.5**	**93.9**	**99.7**	**96.0**	**95.9**
13C8-PFOA	----	0.02	%		**101**	**100**	**96.4**	**95.1**	**94.8**

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2416582**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: Tom Duncan	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 25-Sep-2024
Site	: MFS CAMDEN PARK SUPP DSI	Issue Date	: 02-Oct-2024
Sampler	: TW/JA	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
SW01, SW02	**25-Sep-2024**	**----**	----	**----**	**01-Oct-2024**	24-Mar-2025	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
SW01, SW02	**25-Sep-2024**	**01-Oct-2024**	24-Mar-2025	✓	**01-Oct-2024**	24-Mar-2025	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
SW01, SW02	**25-Sep-2024**	**----**	----	**----**	**02-Oct-2024**	23-Oct-2024	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)							
SW01, SW02	**25-Sep-2024**	**----**	----	**----**	**02-Oct-2024**	23-Oct-2024	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
SW01, SW02	**25-Sep-2024**	**----**	----	**----**	**01-Oct-2024**	23-Oct-2024	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
SW01, SW02	**25-Sep-2024**	**----**	----	**----**	**27-Sep-2024**	27-Sep-2024	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
SW01, SW02	**25-Sep-2024**	**----**	----	**----**	**01-Oct-2024**	23-Oct-2024	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
SW_MYDRANT, SW01, SW02, FB01, RB01	**25-Sep-2024**	**01-Oct-2024**	24-Mar-2025	✓	**01-Oct-2024**	24-Mar-2025	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X)							
SW_MYDRANT, SW01, SW02, FB01, RB01	**25-Sep-2024**	**01-Oct-2024**	24-Mar-2025	✓	**01-Oct-2024**	24-Mar-2025	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) SW_MYDRANT, SW01, SW02	**25-Sep-2024**	**01-Oct-2024**	24-Mar-2025	✓	**01-Oct-2024**	24-Mar-2025	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) SW_MYDRANT, SW01, SW02, FB01, RB01	**25-Sep-2024**	**01-Oct-2024**	24-Mar-2025	✓	**01-Oct-2024**	24-Mar-2025	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) SW_MYDRANT, SW01, SW02, FB01, RB01	**25-Sep-2024**	**01-Oct-2024**	24-Mar-2025	✓	**01-Oct-2024**	24-Mar-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	10	**20.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

QUALITY CONTROL REPORT

Work Order	: **EM2416582**	Page	: 1 of 8
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: Tom Duncan	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 25-Sep-2024
Order number	: ----	Date Analysis Commenced	: 27-Sep-2024
C-O-C number	: ----	Issue Date	: 02-Oct-2024
Sampler	: TW/JA		
Site	: MFS CAMDEN PARK SUPP DSI		
Quote number	: EN/000		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Dilani Fernando	Laboratory Coordinator	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6090666)									
EM2416477-005	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.015	0.015	0.0	No Limit
EM2416493-005	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.016	0.015	0.0	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	0.006	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 6090453)									
EM2416189-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.007	<0.005	32.8	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 6090453) - continued									
EM2416477-004	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 6090665)									
EM2416477-008	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2416676-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	0.0008	0.0008	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 6091207)									
EM2416477-003	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2416582-003	SW02	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6088788)									
EM2416582-002	SW01	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	<0.01	121	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6083198)									
EM2416520-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2416538-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6088789)									
EM2416582-002	SW01	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.03	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6089474)									
EM2416582-001	SW_MYDRANT	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6089474)									
EM2416582-001	SW_MYDRANT	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6089474) - continued									
EM2416582-001	SW_MYDRANT	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 6089474)									
EM2416582-001	SW_MYDRANT	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 6089474)									
EM2416582-001	SW_MYDRANT	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 6089474)									
EM2416582-001	SW_MYDRANT	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 6090666)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.7	89.0	111
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.4	83.5	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.5	83.2	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.8	83.1	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.8	84.6	108
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.2	84.3	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.2	86.3	112
EG020T: Total Metals by ICP-MS (QCLot: 6090453)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	103	89.2	110
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.8	86.4	115
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.6	89.0	112
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.5	88.3	111
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.6	88.3	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	97.3	88.8	113
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.7	90.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 6090665)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	108	71.6	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6091207)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	112	73.4	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6088788)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.9	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6083198)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6088789)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	106	90.0	110
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6089474)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	85.1	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	105	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	85.2	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	96.5	69.0	134

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6089474) - continued								
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	81.3	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	83.7	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6089474)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	91.0	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	85.1	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	86.1	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	83.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	83.0	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	88.7	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	83.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	89.6	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	89.6	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	98.3	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	93.4	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6089474)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	88.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	112	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	96.2	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.5	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	89.8	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	93.0	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	77.8	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6089474)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	88.5	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	84.2	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	92.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	87.1	70.0	130
EP231P: PFAS Sums (QCLot: 6089474)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 6090666)							
EM2416477-005	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	86.8	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	86.6	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	89.8	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	84.0	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	89.2	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	85.3	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	86.5	75.0	131
EG020T: Total Metals by ICP-MS (QCLot: 6090453)							
EM2416189-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	111	82.0	123
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	93.9	81.8	123
		EG020A-T: Chromium	7440-47-3	1 mg/L	108	78.9	119
		EG020A-T: Copper	7440-50-8	1 mg/L	107	80.4	118
		EG020A-T: Lead	7439-92-1	1 mg/L	106	80.5	121
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	80.0	118
		EG020A-T: Zinc	7440-66-6	1 mg/L	108	74.0	120
EG035F: Dissolved Mercury by FIMS (QCLot: 6090665)							
EM2416477-006	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	105	70.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6091207)							
EM2416477-004	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	98.6	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6088788)							
EM2416582-003	SW02	EK055G: Ammonia as N	7664-41-7	1 mg/L	93.5	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6083198)							
EM2416538-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	104	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6088789)							
EM2416582-003	SW02	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.8	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6089474)							
EM2416582-002	SW01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	86.9	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	101	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	87.6	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	96.0	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.6	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	89.3	53.0	142

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6089474)							
EM2416582-002	SW01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	106	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	86.4	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	89.5	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	88.3	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	88.4	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	91.8	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	90.0	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	97.8	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	97.0	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	101	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	98.5	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6089474)							
EM2416582-002	SW01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	97.9	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	126	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	109	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	105	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	101	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	103	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	96.7	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6089474)							
EM2416582-002	SW01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	93.7	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	84.4	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	93.8	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	84.4	70.0	130

CHAIN OF CUSTODY

Mandatory Fields

Page 1 of 1

CoC #: (if applicable)

CLIENT CODE:	*PROJECT MANAGER: TOM DUNCAN	SAMPLER: TW/JA	
*CLIENT: GHD	*PM MOBILE: 0413 476 581	SAMPLER MOBILE: 0467 034 756	
OFFICE: (Invoiced Office) ADELAIDE	ALS QUOTE # (Client PL if blank)	PURCHASE ORDER NO.:	
PROJECT NO./PROJECT: 12645793		SITE: MFS CAMDEN PARK SUPP DSI	
*INVOICE TO: (client default if nil) ACCOUNTSPAYABLEAU@GHD.COM		☑ CC Invoice to PM	BIOSECURITY
*EMAIL REPORTS TO: (default to PM if blank) TOM.DUNCAN@GHD.COM; TERRENCE.WILSON@GHD.COM; BEN.PETTICREW@GHD.COM			Country of Origin: (if not Australia)

*** STORAGE REQUIREMENTS** *Please check box.* →
Standard Storage time from receipt of samples:
Waters - 3 weeks
Soils - 2 months

☑ Standard Storage
☐ Extended Storage

Specify Disposal Date:

Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** *Please check box.* →
(Not all tests can be expedited, contact Client Services for more information)

☑ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

Environmental Division Melbourne
Work Order Reference
EM2416582

Telephone : +61-3-8549 9600

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	PFAS EXTENDED SUITE - ULTRA TRACE PFOS	PFAS SHORT SUITE - ULTRA TRACE PFOS	8 METALS (TOTAL)	8 METALS (DISSOLVED)	NITRATE, NITRITE, AMMONIA	FREIGHT	Lab QC (additional bottles req.) Dup	Lab QC (additional bottles req.) MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
1	SW_HYDRANT			2	W	X						☐	☐	
2	SW01			6	W	X		X	X	X		☐	☐	
3	SW02			6	W	X		X	X	X		☐	☐	
4	FB01			2	W		X					☐	☐	
5	RB01			2	W		X					☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	
												☐	☐	

Receipt Detail (Lab Use ONLY)
Chilling Method: Ice: Frozen / Melted; Ice Bricks: Frozen / Thawed; None
Sample Temp at Receipt °C °C °C
Security Seal Intact *(circle)* Yes / No / NA(None)
Carrier Details ☐ Courier/Post ☐ Client
Con Note #
Packaging: *(Circle)* Hard Esky; Foam Esky; Box/Bag/Other
Count # # #

Relinquished by:	TERRENCE WILSON	Signature:	Date/Time: 25/09/24 15:45	Received by: P.Munns	Signature	Date/Time: 25-9-24 1545
Relinquished by:	P. Munns	Signature:	Date/Time: 25-9-24 1600	Received by: Scott (ALS)	Signature	Date/Time: 26/9/24 ~~1200~~ 1125

CERTIFICATE OF ANALYSIS

Work Order	: **EM2416252**	Page	: 1 of 9
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TOM DUNCAN	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 19-Sep-2024 12:00
Order number	: 12645793	Date Analysis Commenced	: 24-Sep-2024
C-O-C number	: ----	Issue Date	: 26-Sep-2024 14:07
Sampler	: CW		
Site	:		
Quote number	: EN/000		
No. of samples received	: 26		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20mL or 125mL bottles have been tested in accordance with the QSM5.4 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP231X: Poor matrix spike recovery for sample EM2416085_02 due to sample matrix interference.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per tables in USEPA 1633 where listed. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW04_0.1	MW04_1.0	MW05_0.1	MW05_1.4	MW06_0.1
				Sampling date / time	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	19-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416252-001	EM2416252-003	EM2416252-007	EM2416252-010	EM2416252-017
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**2.3**	**13.3**	**9.2**	**20.1**	**11.2**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0037**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0002**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0002**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0007**
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	**0.0011**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	MW04_0.1	MW04_1.0	MW05_0.1	MW05_1.4	MW06_0.1
			Sampling date / time	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	18-Sep-2024 00:00	19-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	EM2416252-001	EM2416252-003	EM2416252-007	EM2416252-010	EM2416252-017
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums								
Sum of PFAS	----	0.0002	mg/kg	**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0059**
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0037**
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	**0.0009**	<0.0002	**0.0046**	<0.0002	**0.0041**
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	**114**	**128**	**131**	**128**	**123**
13C8-PFOA	----	0.0002	%	**107**	**112**	**116**	**114**	**113**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW06_1.6	FD02	TB01	----	----
				Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2416252-021	EM2416252-024	EM2416252-027	--------	--------
					Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		**17.2**	**15.8**	**2.5**	**----**	**----**
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	**----**	**----**
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	<0.001	**----**	**----**
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	**----**	**----**
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	**----**	**----**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW06_1.6	FD02	TB01	----	----
				Sampling date / time	19-Sep-2024 00:00	19-Sep-2024 00:00	19-Sep-2024 00:00	----	----
Compound	CAS Number	LOR	Unit		EM2416252-021	EM2416252-024	EM2416252-027	--------	--------
					Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	**0.0002**	<0.0002	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		**125**	**111**	**111**	----	----
13C8-PFOA	----	0.0002	%		**110**	**116**	**114**	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB01	RB02	----	----	----
				Sampling date / time	18-Sep-2024 00:00	19-Sep-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2416252-016	EM2416252-026	--------	--------	--------
					Result	Result	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L		<0.02	<0.02	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L		<0.1	<0.1	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L		<0.01	<0.01	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L		<0.02	<0.02	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L		<0.05	<0.05	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<0.02	<0.02	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L		<0.05	<0.05	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB01	RB02	----	----	----
				Sampling date / time	18-Sep-2024 00:00	19-Sep-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2416252-016	EM2416252-026	--------	--------	--------
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	<0.05	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	<0.05	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	<0.02	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<0.02	<0.02	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L		<0.05	<0.05	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	<0.05	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	<0.05	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		**102**	**101**	----	----	----
13C8-PFOA	----	0.02	%		**96.3**	**98.3**	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	68	136
13C8-PFOA	----	69	133

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	65	140
13C8-PFOA	----	71	133

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2416252**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TOM DUNCAN	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 19-Sep-2024
Site	:	Issue Date	: 26-Sep-2024
Sampler	: CW	No. of samples received	: 26
Order number	: 12645793	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EM2416153--001	Anonymous	**Perfluorooctane sulfonic acid (PFOS)**	1763-23-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231D: (n:2) Fluorotelomer Sulfonic Acids	EM2416085--002	Anonymous	**10:2 Fluorotelomer sulfonic acid (10:2 FTS)**	120226-60-0	49.0 %	70.0-130%	**Recovery less than lower data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055)								
MW04_0.1,	MW04_1.0,	**18-Sep-2024**	**----**	----	----	**24-Sep-2024**	02-Oct-2024	✓
MW05_0.1,	MW05_1.4							
HDPE Soil Jar (EA055)								
MW06_0.1,	MW06_1.6,	**19-Sep-2024**	**----**	----	----	**24-Sep-2024**	03-Oct-2024	✓
FD02,	TB01							
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X)								
MW04_0.1,	MW04_1.0,	**18-Sep-2024**	**25-Sep-2024**	17-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
MW05_0.1,	MW05_1.4							
HDPE Soil Jar (EP231X)								
MW06_0.1,	MW06_1.6,	**19-Sep-2024**	**25-Sep-2024**	18-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
FD02,	TB01							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE Soil Jar (EP231X) MW04_0.1, MW04_1.0, MW05_0.1, MW05_1.4	**18-Sep-2024**	**25-Sep-2024**	17-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
HDPE Soil Jar (EP231X) MW06_0.1, MW06_1.6, FD02, TB01	**19-Sep-2024**	**25-Sep-2024**	18-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X) MW04_0.1, MW04_1.0, MW05_0.1, MW05_1.4	**18-Sep-2024**	**25-Sep-2024**	17-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
HDPE Soil Jar (EP231X) MW06_0.1, MW06_1.6, FD02, TB01	**19-Sep-2024**	**25-Sep-2024**	18-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE Soil Jar (EP231X) MW04_0.1, MW04_1.0, MW05_0.1, MW05_1.4	**18-Sep-2024**	**25-Sep-2024**	17-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
HDPE Soil Jar (EP231X) MW06_0.1, MW06_1.6, FD02, TB01	**19-Sep-2024**	**25-Sep-2024**	18-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
EP231P: PFAS Sums							
HDPE Soil Jar (EP231X) MW04_0.1, MW04_1.0, MW05_0.1, MW05_1.4	**18-Sep-2024**	**25-Sep-2024**	17-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓
HDPE Soil Jar (EP231X) MW06_0.1, MW06_1.6, FD02, TB01	**19-Sep-2024**	**25-Sep-2024**	18-Mar-2025	✓	**25-Sep-2024**	04-Nov-2024	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) RB01	**18-Sep-2024**	**24-Sep-2024**	17-Mar-2025	✓	**24-Sep-2024**	17-Mar-2025	✓
HDPE (no PTFE) (EP231X) RB02	**19-Sep-2024**	**24-Sep-2024**	18-Mar-2025	✓	**24-Sep-2024**	18-Mar-2025	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) RB01	**18-Sep-2024**	**24-Sep-2024**	17-Mar-2025	✓	**24-Sep-2024**	17-Mar-2025	✓
HDPE (no PTFE) (EP231X) RB02	**19-Sep-2024**	**24-Sep-2024**	18-Mar-2025	✓	**24-Sep-2024**	18-Mar-2025	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) RB01	**18-Sep-2024**	**24-Sep-2024**	17-Mar-2025	✓	**24-Sep-2024**	17-Mar-2025	✓
HDPE (no PTFE) (EP231X) RB02	**19-Sep-2024**	**24-Sep-2024**	18-Mar-2025	✓	**24-Sep-2024**	18-Mar-2025	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) RB01	**18-Sep-2024**	**24-Sep-2024**	17-Mar-2025	✓	**24-Sep-2024**	17-Mar-2025	✓
HDPE (no PTFE) (EP231X) RB02	**19-Sep-2024**	**24-Sep-2024**	18-Mar-2025	✓	**24-Sep-2024**	18-Mar-2025	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) RB01	**18-Sep-2024**	**24-Sep-2024**	17-Mar-2025	✓	**24-Sep-2024**	17-Mar-2025	✓
HDPE (no PTFE) (EP231X) RB02	**19-Sep-2024**	**24-Sep-2024**	18-Mar-2025	✓	**24-Sep-2024**	18-Mar-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-house: Analysis of soils by solvent extraction followed by LC-Electrospray-MS-MS, Negative Mode using MRM using internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to a portion of soil which is then extracted with MTBE and an ion pairing reagent. A portion of extract is exchanged into the analytical solvent mixture, combined with an equal volume reagent water and filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.4, table B-15 requirements.

Preparation Methods	Method	Matrix	Method Descriptions
QuECheRS Extraction of Solids	ORG71	SOIL	In house: Sequential extractions with Acetonitrile/Methanol by shaking. Extraction efficiency aided by the addition of salts under acidic conditions. Where relevant, interferences from co-extracted organics are removed with dispersive clean-up media (dSPE). The extract is either diluted or concentrated and exchanged into the analytical solvent.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

QUALITY CONTROL REPORT

Work Order	: **EM2416252**	Page	: 1 of 12
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: TOM DUNCAN	Contact	: Peter Ravlic
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9645
Project	: 12645793	Date Samples Received	: 19-Sep-2024
Order number	: 12645793	Date Analysis Commenced	: 24-Sep-2024
C-O-C number	: ----	Issue Date	: 26-Sep-2024
Sampler	: CW		
Site	:		
Quote number	: EN/000		
No. of samples received	: 26		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Jarwis Nheu	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 6074412)									
EM2416193-001	Anonymous	EA055: Moisture Content	----	0.1 (1.0)*	%	12.1	12.3	1.5	0% - 50%
EM2416266-002	Anonymous	EA055: Moisture Content	----	0.1 (1.0)*	%	18.8	17.9	5.1	0% - 50%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6077052)									
EM2415384-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0018	0.0016	10.7	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EM2416252-010	MW05_1.4	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6077052)									
EM2415384-002	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6077052) - continued									
EM2415384-002	Anonymous	EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EM2416252-010	MW05_1.4	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 6077052)									
EM2415384-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EM2416252-010	MW05_1.4	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 6077052) - continued									
EM2416252-010	MW05_1.4	EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 6077052)									
EM2415384-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EM2416252-010	MW05_1.4	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 6077052)									
EM2415384-002	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0022	0.0020	9.5	0% - 50%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0018	0.0016	11.8	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0022	0.0020	9.5	0% - 50%
EM2416252-010	MW05_1.4	EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6075897)									
EM2416085-001	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.54	0.54	0.0	0% - 20%
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.21	0.20	0.0	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.05	0.05	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6075897) - continued									
EM2416085-001	Anonymous	EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EM2416157-004	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6075897)									
EM2416085-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.06	0.05	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.14	0.14	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.12	0.12	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EM2416157-004	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.02	0.02	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 6075897)									
EM2416085-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 6075897) - continued									
EM2416085-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EM2416157-004	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 6075897)									
EM2416085-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EM2416157-004	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.0	No Limit
EP231P: PFAS Sums (QC Lot: 6075897)									
EM2416085-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	1.24	1.22	1.6	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP231P: PFAS Sums (QC Lot: 6075897) - continued									
EM2416085-001	Anonymous	EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.75	0.74	1.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	1.15	1.13	1.8	0% - 20%
EM2416157-004	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	0.04	0.04	0.0	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	0.04	0.04	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6077052)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	86.5	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	114	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	99.3	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	110	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	90.2	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	83.6	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6077052)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	91.1	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.3	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.9	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.9	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.2	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.9	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.4	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.8	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.3	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	102	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6077052)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.8	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.4	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.0	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.3	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.2	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.8	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6077052)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6077052) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	91.8	62.0	145
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00119 mg/kg	91.4	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0012 mg/kg	92.8	65.0	137
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00121 mg/kg	88.7	70.0	130
EP231P: PFAS Sums (QCLot: 6077052)								
EP231X: Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.0002	mg/kg	<0.0002	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6075897)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.222 µg/L	89.4	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.235 µg/L	105	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.228 µg/L	93.6	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.238 µg/L	99.7	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.232 µg/L	94.0	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.241 µg/L	93.5	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6075897)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	94.8	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	96.2	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	94.8	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	94.0	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	93.4	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	110	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	92.6	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	96.6	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	95.5	72.0	134
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	99.7	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	103	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6075897)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	95.6	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	114	68.0	141

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6075897) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	104	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	90.0	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	97.4	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	97.5	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	98.6	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6075897)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.234 µg/L	94.3	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.238 µg/L	94.4	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.24 µg/L	89.0	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.242 µg/L	84.5	70.0	130
EP231P: PFAS Sums (QCLot: 6075897)								
EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X: Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6077052)							
EM2416153-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	99.9	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	93.2	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	85.2	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	88.5	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	# Not Determined	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00121 mg/kg	64.8	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6077052)							
EM2416153-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	82.4	71.0	135

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6077052) - continued							
EM2416153-001	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	81.3	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	97.6	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	90.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	92.8	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	94.5	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	107	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	97.8	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	96.5	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	89.2	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	131	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6077052)							
EM2416153-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	86.8	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	117	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	103	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	105	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	111	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	97.3	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	96.1	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6077052)							
EM2416153-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	94.5	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00119 mg/kg	118	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	88.2	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00121 mg/kg	80.3	70.0	130

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6075897)							
EM2416085-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	87.0	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	88.5	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	95.7	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	88.4	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	90.8	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	69.1	53.0	142

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6075897)							
EM2416085-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	91.5	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	93.3	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	86.9	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	92.0	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	93.5	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	108	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	95.9	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	90.9	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	95.0	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	77.6	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	100	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6075897)							
EM2416085-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	88.0	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	110	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	96.7	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	87.2	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	100	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	92.7	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	89.3	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6075897)							
EM2416085-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	101	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	91.3	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	90.4	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	# 49.0	70.0	130

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory: please tick →

FREIGHT

(1)

CLIENT: GHD	TURNAROUND REQUIREMENTS: ☒ Standard TAT (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):		FOR LABORATORY USE ONLY (Circle)
OFFICE: Adelaide	ALS QUOTE:	COC SEQUENCE NUMBER (Circle)	Custody Seal Intact? Yes / No / N/A
Camden Park		COC: (1) 2 3 4 5 6 7	Free ice / frozen ice bricks present upon arrival? Yes / No / N/A
PROJECT: ~~Bort Adelaide~~ Fire Station - Further Investigations	ORDER NO: ~~12645781~~ 12645793	OF: 1 (2) 3 4 5 6 7	Random Sample Temperature on 1.2 °C
PROJECT MANAGER: Tom Duncan	CONTACT PH: 0413 476 581		Other comment:
SAMPLER: CW	SAMPLER MOBILE: 0402689487	RELINQUISHED BY: CW	RECEIVED BY: K. BURNS 19/9/24 12:30
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): Esdat		RELINQUISHED DATE/TIME:
Email Reports to: Tom.Duncan@ghd.com; Lachlan.Callaghan@ghd.com, Terrence.Wilson@ghd.com; GHDLabReports@ghd.com			RECEIVED BY: CAITLIN (ALS) DATE/TIME: 20/9/24 10:48
Email Invoice to: Tom.Duncan@ghd.com; accountspayableAU@ghd.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS Full Suite - Standard LOR							HOLD	Comments on likely contaminant levels, dilutions, or samples requiring special handling or analysis etc.
✓	MW04_0.1	19/9/24	S		2	X								
✓	MW04_0.5					[illegible]							X	
✓	MW04_1.0					X								
✓	MW04_1.5					[illegible]							X	
✓	MW04_2.0												X	
✓	MW04_2.4												X	
✓	MW05_0.1					X								
✓	MW05_0.5												X	
✓	MW05_1.0												X	
✓	MW05_1.4					X								
✓	MW05_1.5												X	
✓	MW05_2.0												X	
✓	MW05_2.4												X	
✓	FD01												X	
✓	FS01												X	
✓	RB01		W		2	X								Rinsate Hand Auger
✓	MW06_0.1	19/9/24	S		1	X								
✓	MW06_0.5												X	
✓	MW06_1.0												X	
✓	MW06_1.5												X	
✓	MW06_1.6					X								
✓	MW06_2.0												X	
✓	MW06_2.9												X	
				TOTAL										

Environmental Division Melbourne
Work Order Reference
EM2416252

Telephone : +61-3-8549 9600

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

(2)

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory: please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS: ☒ Standard TAT (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: Adelaide Cadmen Park	ALS QUOTE:	Custody Seal Intact? Yes No N/A
PROJECT: ~~Port Adelaide~~ Fire Station - Further Investigations	ORDER NO.: ~~12646741~~ 12645793	COC SEQUENCE NUMBER (Circle) COC: 1 (2) 3 4 5 6 7
PROJECT MANAGER: Tom Duncan	CONTACT PH: 0413 476 581	OF: 1 (2) 3 4 5 6 7
SAMPLER: CW	SAMPLER MOBILE: 0402689487	Free ice / frozen ice bricks present upon Random Sample Temperature on: Yes No N/A °C
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): Esdat	Other comment:

Email Reports to: Tom.Duncan@ghd.com; Lachlan.Callaghan@ghd.com, Terrence.Wilson@ghd.com; GHDLabReports@ghd.com	RELINQUISHED BY: CW	RECEIVED BY:	RELINQUISHED DATE/TIME:	RECEIVED BY: CAITLIN (ALS) DATE/TIME: 20/9/24 10:48
Email Invoice to: Tom.Duncan@ghd.com; accountspayableAU@ghd.com				

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS Full Suite - Standard LOR							HOLD	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
24 ✓	FD02	19/9/24	S		1	X								
→ 25 ✓	FS02	↓	↓		1	X								Please forward to EUROFINS
26 ✓	RB02		W		2	X								Rinsate of Hand Auger
27 ✓	TB01		S		1	X								Sand Trip Blank
					TOTAL									

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

GHD Pty Ltd
GPO Box 2052
Adelaide
SA 5001

Attention: **Tom Duncan**

Report **1148891-W**
Project name MFS CAMDEN PARK SUPP DSI
Project ID 12645793
Received Date Oct 14, 2024

Client Sample ID			**FS01**
Sample Matrix			**Water**
Eurofins Sample No.			**M24-Oc0033946**
Date Sampled			**Oct 09, 2024**
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace			
Perfluorobutanoic acid (PFBA)[N11]	0.005	ug/L	< 0.005
Perfluorodecanoic acid (PFDA)[N11]	0.001	ug/L	< 0.001
Perfluorododecanoic acid (PFDoDA)[N11]	0.001	ug/L	< 0.001
Perfluoroheptanoic acid (PFHpA)[N11]	0.001	ug/L	< 0.001
Perfluorohexanoic acid (PFHxA)[N11]	0.001	ug/L	0.005
Perfluorononanoic acid (PFNA)[N11]	0.001	ug/L	< 0.001
Perfluorooctanoic acid (PFOA)[N11]	0.001	ug/L	[N09]0.003
Perfluoropentanoic acid (PFPeA)[N11]	0.001	ug/L	0.001
Perfluorotetradecanoic acid (PFTeDA)[N11]	0.001	ug/L	< 0.001
Perfluorotridecanoic acid (PFTrDA)[N15]	0.001	ug/L	< 0.001
Perfluoroundecanoic acid (PFUnDA)[N11]	0.001	ug/L	< 0.001
13C4-PFBA (surr.)	1	%	88
13C5-PFPeA (surr.)	1	%	83
13C5-PFHxA (surr.)	1	%	109
13C4-PFHpA (surr.)	1	%	114
13C8-PFOA (surr.)	1	%	62
13C5-PFNA (surr.)	1	%	85
13C6-PFDA (surr.)	1	%	87
13C2-PFUnDA (surr.)	1	%	58
13C2-PFDoDA (surr.)	1	%	56
13C2-PFTeDA (surr.)	1	%	36
Perfluoroalkyl sulfonic acids (PFSAs)- Ultra Trace			
Perfluorobutanesulfonic acid (PFBS)[N11]	0.001	ug/L	[N09]0.009
Perfluorononanesulfonic acid (PFNS)[N15]	0.001	ug/L	< 0.001
Perfluoropropanesulfonic acid (PFPrS)[N15]	0.001	ug/L	0.005
Perfluoropentanesulfonic acid (PFPeS)[N15]	0.001	ug/L	[N09]0.008
Perfluorohexanesulfonic acid (PFHxS)[N11]	0.001	ug/L	[N09]0.064
Perfluoroheptanesulfonic acid (PFHpS)[N15]	0.001	ug/L	[N09]0.003
Perfluorooctanesulfonic acid (PFOS)[N11]	0.0001	ug/L	0.19
Perfluorodecanesulfonic acid (PFDS)[N15]	0.001	ug/L	< 0.001
13C3-PFBS (surr.)	1	%	102
18O2-PFHxS (surr.)	1	%	108
13C8-PFOS (surr.)	1	%	101

Client Sample ID			FS01
Sample Matrix			Water
Eurofins Sample No.			M24-Oc0033946
Date Sampled			Oct 09, 2024
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonamido substances- Ultra Trace			
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	0.005	ug/L	< 0.005
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	0.005	ug/L	< 0.005
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	0.005	ug/L	< 0.005
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	0.005	ug/L	< 0.005
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	0.005	ug/L	< 0.005
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	0.005	ug/L	< 0.005
Perfluorooctane sulfonamide (FOSA)[N11]	0.005	ug/L	< 0.005
13C8-FOSA (surr.)	1	%	138
D3-N-MeFOSA (surr.)	1	%	81
D5-N-EtFOSA (surr.)	1	%	64
D7-N-MeFOSE (surr.)	1	%	80
D9-N-EtFOSE (surr.)	1	%	74
D5-N-EtFOSAA (surr.)	1	%	53
D3-N-MeFOSAA (surr.)	1	%	56
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Ultra Trace			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	0.001	ug/L	< 0.001
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	0.005	ug/L	< 0.005
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	0.001	ug/L	< 0.001
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	0.001	ug/L	< 0.001
13C2-4:2 FTSA (surr.)	1	%	54
13C2-6:2 FTSA (surr.)	1	%	155
13C2-8:2 FTSA (surr.)	1	%	120
13C2-10:2 FTSA (surr.)	1	%	75
PFASs Summations			
Sum (PFHxS + PFOS)*	0.001	ug/L	0.254
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	0.193
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	0.257
Sum of WA DWER PFAS (n=10)*	0.005	ug/L	0.272
Sum of PFASs (n=30)*	0.005	ug/L	0.288

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace	Melbourne	Oct 15, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - ultra trace			
Perfluoroalkyl sulfonic acids (PFSAs)- Ultra Trace	Melbourne	Oct 15, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - ultra trace			
Perfluoroalkyl sulfonamido substances- Ultra Trace	Melbourne	Oct 15, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - ultra trace			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Ultra Trace	Melbourne	Oct 15, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS) - ultra trace			

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool
WA 6106
+61 8 6253 4444
NATA# 2377
Site# 2370 & 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd SA
Address: GPO Box 2052
Adelaide
SA 5001

Project Name: MFS CAMDEN PARK SUPP DSI
Project ID: 12645793

Order No.:
Report #: 1148891
Phone: 08 8111 6600
Fax: 08 8111 6699

Received: Oct 14, 2024 4:25 PM
Due: Oct 21, 2024
Priority: 5 Day
Contact Name: Tom Duncan

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs) - Ultra Trace
Melbourne Laboratory - NATA # 1261 Site # 1254						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	FS01	Oct 09, 2024		Water	M24-Oc0033946	X
Test Counts						1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.005			0.005	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.001			0.001	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.001			0.001	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.001			0.001	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.001			0.001	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.001			0.001	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.001			0.001	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.001			0.001	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)- Ultra Trace							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.001			0.001	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.001			0.001	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.001			0.001	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.0001			0.0001	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.001			0.001	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances- Ultra Trace							
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.005			0.005	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.005			0.005	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.005			0.005	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.005			0.005	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.005			0.005	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.005			0.005	Pass	
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.005			0.005	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Ultra Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.005			0.005	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace							
Perfluorobutanoic acid (PFBA)	%	91			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	82			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	86			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	80			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	93			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	85			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	81			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	99			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	93			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	56			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	92			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)- Ultra Trace							
Perfluorobutanesulfonic acid (PFBS)	%	88			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	82			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	119			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	82			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	87			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	97			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	88			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	69			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances- Ultra Trace							
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	92			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	97			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	85			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	108			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	92			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	98			50-150	Pass	
Perfluorooctane sulfonamide (FOSA)	%	98			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Ultra Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	90			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	95			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	98			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	107			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace				Result 1					
Perfluorobutanoic acid (PFBA)	W24-Oc0019755	NCP	%	81			50-150	Pass	
Perfluorodecanoic acid (PFDA)	S24-Oc0029565	NCP	%	89			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	S24-Oc0029565	NCP	%	94			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	S24-Oc0029565	NCP	%	82			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	S24-Oc0029565	NCP	%	100			50-150	Pass	
Perfluorononanoic acid (PFNA)	S24-Oc0029565	NCP	%	91			50-150	Pass	
Perfluorooctanoic acid (PFOA)	S24-Oc0029565	NCP	%	85			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	R24-Oc0015545	NCP	%	58			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S24-Oc0029565	NCP	%	108			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	S24-Oc0029565	NCP	%	56			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	S24-Oc0029565	NCP	%	91			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)- Ultra Trace				Result 1					
Perfluorobutanesulfonic acid (PFBS)	S24-Oc0029565	NCP	%	95			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	S24-Oc0029565	NCP	%	85			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	S24-Oc0029565	NCP	%	92			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	S24-Oc0029565	NCP	%	81			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S24-Oc0029565	NCP	%	92			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroheptanesulfonic acid (PFHpS)	S24-Oc0029565	NCP	%	105			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	S24-Oc0029565	NCP	%	93			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	S24-Oc0029565	NCP	%	56			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances- Ultra Trace				Result 1					
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	S24-Oc0029565	NCP	%	110			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	S24-Oc0029565	NCP	%	118			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	S24-Oc0029565	NCP	%	99			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S24-Oc0029565	NCP	%	113			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	S24-Oc0029565	NCP	%	93			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S24-Oc0029565	NCP	%	114			50-150	Pass	
Perfluorooctane sulfonamide (FOSA)	S24-Oc0029565	NCP	%	109			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Ultra Trace				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	S24-Oc0029565	NCP	%	98			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	W24-Oc0019755	NCP	%	69			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	W24-Oc0019755	NCP	%	106			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S24-Oc0029565	NCP	%	110			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	S24-Oc0029572	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S24-Oc0025611	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)- Ultra Trace				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	S24-Oc0029572	NCP	ug/L	< 0.0001	< 0.0001	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonamido substances- Ultra Trace				Result 1	Result 2	RPD			
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	S24-Oc0029572	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	S24-Oc0029572	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
Perfluorooctane sulfonamide (FOSA)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Ultra Trace				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	S24-Oc0029572	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Catherine Wilson	Analytical Services Manager
Joseph Edouard	Senior Analyst-PFAS

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Perth
46-48 Banksia Road
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WA 6106
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Site# 2370 & 2554

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd SA
Address: GPO Box 2052
Adelaide
SA 5001

Project Name: MFS CAMDEN PARK SUPP DSI
Project ID: 12645793

Order No.:
Report #: 1148891
Phone: 08 8111 6600
Fax: 08 8111 6699

Received: Oct 14, 2024 4:25 PM
Due: Oct 21, 2024
Priority: 5 Day
Contact Name: Tom Duncan

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs) - Ultra Trace
Melbourne Laboratory - NATA # 1261 Site # 1254						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	FS01	Oct 09, 2024		Water	M24-Oc0033946	X
Test Counts						1

ISS

CHAIN OF CUSTODY

Mandatory Fields

FREIGHT

Page 1 of 1

CoC #: (if applicable)

ALS

CLIENT CODE:	12645793	*PROJECT MANAGER:	TOM DUNCAN	SAMPLER:	TW/AV
*CLIENT:	GHD	*PM MOBILE:	0413 476 581	SAMPLER MOBILE:	0467 034 756
OFFICE: (Invoiced Office)	GHD ADELAIDE	ALS QUOTE # (Client PL if blank)		PURCHASE ORDER NO.:	
PROJECT NO./PROJECT:	12645793 MFS CAMDEN PARK SUPP. DSI			SITE:	
*INVOICE TO: (client default if nil)	accountspayableAU@ghd.com.			CC Invoice to PM	☑
*EMAIL REPORTS TO: (default to PM if blank)	Thomas.Duncan@ghd.com; AngelicaMaria.VilladaMeza@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com				

BIOSECURITY

Country of Origin: (if not Australia)

*** STORAGE REQUIREMENTS** Please check box. → Standard Storage time from receipt of samples: Waters - 3 weeks Soils - 2 months

☑ Standard Storage
☐ Extended Storage

Specify Disposal Date:

Note: Extended storage incurs a fee and requires a signed agreement.

*** TURNAROUND** Please check box → (Not all tests can be expedited, contact Client Services for more information)

☑ 5+ days (no surcharge)
☐ 3 day (+15%)
☐ 2 day (+30%)
☐ 1 day (+50%)

***ANALYSIS REQUIRED**
(NB. ALS Quote No. and/or Analysis Suite Codes must be listed to attract suite/quoted price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).
Mark an X in the boxes below analysis to indicate the parameter listed above to be tested on that sample.

WO Sticker to go here. (ALS use only)

DATE: 14/10/24
TIME: 16:25
COURIER: yes
TEMPERATURE: 5.7°C
ATTEMPT TO CHILL: (YES) NO
CH

Comments:

ALS Use Only Lab ID	Sample ID	Depth	Date/Time	No. Bottles	MATRIX: Soil/Solid(S) Water(W) Sediments (SD), Dust (D), Product (P), Biota (B), Biosolid (BS)	PFAS Extended Suite (Super Ultra-trace PFOS)	PFAS TOPA (Low level)	NITRATE, NITRITE, AMMONIA	8 METALS (TOTAL)	8 METALS (DISSOLVED)	MAJOR CATIONS + ANIONS	PFAS SHORT SUITE (SUPER ULTRA-TRACE PFOS)					Lab QC Dup	Lab QC MS	Additional Information (Comment on hazards - e.g., asbestos, known high contamination)
1	MW01	-	09/10/24	4	W	X	X										☐	☐	
2	MW02	-	09/10/24	2	W	X											☐	☐	
3	MW03	-	09/10/24	2	W	X											☐	☐	
4	MW04	-	09/10/24	6	W	X		X	X	X	X						☐	☐	
5	MW05	-	09/10/24	3	W	X											☐	☐	PLACE MAJOR CATIONS+ ANIONS SAMPLE ON HOLD
6	MW06	-	09/10/24	4	W	X	X										☐	☐	
7	FD01	-	09/10/24	2	W	X											☐	☐	
→	FS01	-	09/10/24	2	W	X											☐	☐	PLEASE FORWARD TO EUROFINS
8	FB01	-	09/10/24	2	W							X					☐	☐	
9	RB01	-	09/10/24	2	W							X					☐	☐	

& 11/10/24 BM485411

Receipt Detail (Lab Use ONLY)	Chilling Method: Ice: Frozen / Melted; Ice Bricks: Frozen / Thawed; None
Sample Temp at Receipt	25.1 °C °C °C
Security Seal Intact (circle)	Yes / No / NA(None)
Carrier Details	☐ Courier/Post ☐ Client
Con Note #	
Packaging: (Circle)	Hard Esky / Foam Esky / Box/Bag/Other
Count	# # #

Relinquished by:	Signature:	Date/Time:	Received by:	Signature	Date/Time:
TERRENCE WILSON	[signature]	09/10/24 16:15	K. BURNS	[signature]	9/10/24 4.30pm
[signature]	[signature]	10-10-24 1600	[signature]	[signature]	11/10 1200

GHD Pty Ltd
GPO Box 2052
Adelaide
SA 5001

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Tom Duncan**

Report **1142062-S**
Project name CADMEN PARK FIRE STATION - FURTHER INVESTIGATIONS
Project ID 12645793
Received Date Sep 23, 2024

Client Sample ID			**FS02**
Sample Matrix			**Soil**
Eurofins Sample No.			**M24-Se0058904**
Date Sampled			**Sep 19, 2024**
Test/Reference	LOR	Unit	
Sample Properties			
% Moisture	1	%	27
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)[N11]	5	ug/kg	< 5
Perfluoropentanoic acid (PFPeA)[N11]	5	ug/kg	< 5
Perfluorohexanoic acid (PFHxA)[N11]	5	ug/kg	< 5
Perfluoroheptanoic acid (PFHpA)[N11]	5	ug/kg	< 5
Perfluorooctanoic acid (PFOA)[N11]	5	ug/kg	< 5
Perfluorononanoic acid (PFNA)[N11]	5	ug/kg	< 5
Perfluorodecanoic acid (PFDA)[N11]	5	ug/kg	< 5
Perfluoroundecanoic acid (PFUnDA)[N11]	5	ug/kg	< 5
Perfluorododecanoic acid (PFDoDA)[N11]	5	ug/kg	< 5
Perfluorotridecanoic acid (PFTrDA)[N15]	5	ug/kg	< 5
Perfluorotetradecanoic acid (PFTeDA)[N11]	5	ug/kg	< 5
13C4-PFBA (surr.)	1	%	88
13C5-PFPeA (surr.)	1	%	91
13C5-PFHxA (surr.)	1	%	92
13C4-PFHpA (surr.)	1	%	93
13C8-PFOA (surr.)	1	%	98
13C5-PFNA (surr.)	1	%	72
13C6-PFDA (surr.)	1	%	77
13C2-PFUnDA (surr.)	1	%	99
13C2-PFDoDA (surr.)	1	%	54
13C2-PFTeDA (surr.)	1	%	97
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA)[N11]	5	ug/kg	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)[N11]	5	ug/kg	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)[N11]	5	ug/kg	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)[N11]	5	ug/kg	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)[N11]	5	ug/kg	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)[N11]	10	ug/kg	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)[N11]	10	ug/kg	< 10

Client Sample ID			FS02
Sample Matrix			Soil
Eurofins Sample No.			M24-Se0058904
Date Sampled			Sep 19, 2024
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonamido substances			
13C8-FOSA (surr.)	1	%	76
D3-N-MeFOSA (surr.)	1	%	101
D5-N-EtFOSA (surr.)	1	%	95
D7-N-MeFOSE (surr.)	1	%	110
D9-N-EtFOSE (surr.)	1	%	93
D5-N-EtFOSAA (surr.)	1	%	107
D3-N-MeFOSAA (surr.)	1	%	116
Perfluoroalkyl sulfonic acids (PFSAs)			
Perfluorobutanesulfonic acid (PFBS)[N11]	5	ug/kg	< 5
Perfluorononanesulfonic acid (PFNS)[N15]	5	ug/kg	< 5
Perfluoropropanesulfonic acid (PFPrS)[N15]	5	ug/kg	< 5
Perfluoropentanesulfonic acid (PFPeS)[N15]	5	ug/kg	< 5
Perfluorohexanesulfonic acid (PFHxS)[N11]	5	ug/kg	< 5
Perfluoroheptanesulfonic acid (PFHpS)[N15]	5	ug/kg	< 5
Perfluorooctanesulfonic acid (PFOS)[N11]	5	ug/kg	< 5
Perfluorodecanesulfonic acid (PFDS)[N15]	5	ug/kg	< 5
13C3-PFBS (surr.)	1	%	85
18O2-PFHxS (surr.)	1	%	88
13C8-PFOS (surr.)	1	%	67
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)[N11]	5	ug/kg	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)[N11]	10	ug/kg	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)[N11]	5	ug/kg	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)[N11]	5	ug/kg	< 5
13C2-4:2 FTSA (surr.)	1	%	84
13C2-6:2 FTSA (surr.)	1	%	91
13C2-8:2 FTSA (surr.)	1	%	93
13C2-10:2 FTSA (surr.)	1	%	109
PFASs Summations			
Sum (PFHxS + PFOS)*	5	ug/kg	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10
Sum of PFASs (n=30)*	50	ug/kg	< 50

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
% Moisture	Melbourne	Sep 23, 2024	14 Days
- Method: LTM-GEN-7080 Moisture			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Sep 24, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Sep 24, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Sep 24, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Sep 24, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Sep 23, 2024	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

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6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
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VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

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Project Name: CADMEN PARK FIRE STATION - FURTHER INVESTIGATIONS
Project ID: 12645793

Order No.: 12645793
Report #: 1142062
Phone: 08 8111 6600
Fax: 08 8111 6699

Received: Sep 23, 2024 4:40 PM
Due: Oct 1, 2024
Priority: 5 Day
Contact Name: Tom Duncan

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	FS02	Sep 19, 2024		Soil	M24-Se0058904	X	X
Test Counts						1	1

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ppm: parts per million
µg/L: micrograms per litre
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit
Colour: Pt-Co Units (CU)

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/kg	< 5			5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 5			5	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 5			5	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 5			5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5			5	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 5			5	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 5			5	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 5			5	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 5			5	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/kg	< 5			5	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 5			5	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 5			5	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 5			5	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 5			5	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/kg	< 5			5	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/kg	< 5			5	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 10			10	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 10			10	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 5			5	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/kg	< 5			5	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/kg	< 5			5	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 5			5	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 5			5	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 5			5	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 5			5	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 5			5	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/kg	< 10			10	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/kg	< 5			5	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/kg	< 5			5	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	105			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	105			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	99			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	105			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	100			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	100			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	110			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	112			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	117			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	143			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	101			50-150	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	110			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	110			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	107			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	%	86			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	%	108			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	107			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	111			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	102			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	132			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	%	108			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	100			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	98			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	83			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	%	108			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	%	123			50-150	Pass	
LCS - % Recovery							
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	%	111			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	%	102			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	%	99			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	%	101			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1					
Perfluorobutanoic acid (PFBA)	M24-Se0055683	NCP	%	92			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M24-Se0055683	NCP	%	92			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M24-Se0055683	NCP	%	88			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-Se0055683	NCP	%	89			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M24-Se0055683	NCP	%	91			50-150	Pass	
Perfluorononanoic acid (PFNA)	M24-Se0055683	NCP	%	85			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M24-Se0055683	NCP	%	88			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M24-Se0055683	NCP	%	95			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M24-Se0055683	NCP	%	102			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M24-Se0055683	NCP	%	147			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M24-Se0055683	NCP	%	88			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluorooctane sulfonamide (FOSA)	M24-Se0055683	NCP	%	98			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M24-Se0055683	NCP	%	91			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M24-Se0055683	NCP	%	92			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M24-Se0055683	NCP	%	80			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M24-Se0055683	NCP	%	96			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M24-Se0055683	NCP	%	87			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M24-Se0055683	NCP	%	88			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M24-Se0055683	NCP	%	92			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M24-Se0055683	NCP	%	112			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M24-Se0055683	NCP	%	95			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M24-Se0055683	NCP	%	98			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M24-Se0055683	NCP	%	96			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M24-Se0055683	NCP	%	58			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M24-Se0055683	NCP	%	87			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M24-Se0055683	NCP	%	101			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M24-Se0055683	NCP	%	86			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-Se0055683	NCP	%	96			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M24-Se0055683	NCP	%	92			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M24-Se0055683	NCP	%	99			50-150	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M24-Se0058904	CP	%	27	24	14	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	

Duplicate									
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M24-Se0058904	CP	ug/kg	< 10	< 10	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M24-Se0058904	CP	ug/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD			
Perfluorobutanesulfonic acid (PFBS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanesulfonic acid (PFNS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanesulfonic acid (PFOS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanesulfonic acid (PFDS)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1	Result 2	RPD			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-Se0058904	CP	ug/kg	< 10	< 10	<1	30%	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M24-Se0058904	CP	ug/kg	< 5	< 5	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised by:

Catherine Wilson	Analytical Services Manager
Joseph Edouard	Senior Analyst-PFAS

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins

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Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794 & 2780	Site# 25079

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Auckland	Auckland (Focus)	Christchurch	Tauranga
35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: GHD Pty Ltd SA
Address: GPO Box 2052
Adelaide
SA 5001

Project Name: CADMEN PARK FIRE STATION - FURTHER INVESTIGATIONS
Project ID: 12645793

Order No.: 12645793
Report #: 1142062
Phone: 08 8111 6600
Fax: 08 8111 6699

Received: Sep 23, 2024 4:40 PM
Due: Oct 1, 2024
Priority: 5 Day
Contact Name: Tom Duncan

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	FS02	Sep 19, 2024		Soil	M24-Se0058904	X	X
Test Counts						1	1

②

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CHAIN OF CUSTODY

ALS Laboratory: please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☒ Standard TAT ☐ Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: 7°C °C Other comment: ICE
OFFICE: Adelaide Cudmore Park	ALS QUOTE:	COC SEQUENCE NUMBER (Circle) COC: 1 ② 3 4 5 6 7 OF: 1 ② 3 4 5 6 7	
PROJECT: ~~Port Adelaide~~ Fire Station - Further Investigations	ORDER NO.: ~~12645793~~ 12645793		
PROJECT MANAGER: Tom Duncan	CONTACT PH: 0413 476 581		
SAMPLER: CW	SAMPLER MOBILE: 0402689487	RELINQUISHED BY: CW	RECEIVED BY: Nicole (ZF) 23/9/24 4:00pm
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): Esdat		RELINQUISHED BY: DATE/TIME:
Email Reports to: Tom.Duncan@ghd.com; Lachlan.Callaghan@ghd.com, Terrence.Wilson@ghd.com; GHDLabReports@ghd.com			RECEIVED BY: CAITLIN (ALS) DATE/TIME: 20/9/24 10:48
Email Invoice to: Tom.Duncan@ghd.com; accountspayableAU@ghd.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE LAB ID	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS Full Suite - Standard LOR	Hold	Additional Information Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
24 ✓	FD02	19/9/24	S		1	X		
→ 25 ✓	FS02	↓	↓		1	X		Please forward to EUROFINS
26 ✓	RB02	↓	W		2	X		Rinsate of Hand Auger
27 ✓	TB01		S		1	X		Sand Trip Blank
					TOTAL			

Ø 23/9/24 BN1412062

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Appendix G

Tabulated Analytical Results

						Field ID	MW04_0.1	MW04_1.0	MW05_0.1	MW05_1.4
						Date	18 Sep 2024	18 Sep 2024	18 Sep 2024	18 Sep 2024
						Lab Report Number	EM2416252	EM2416252	EM2416252	EM2416252
	Unit	**EQL**	**PFAS NEMP 2.0 2020 Ecological direct exposure**	**PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites**	**SA MFS Site Specific Criteria - Metropolitan (Staffed)**	**PFAS NEMP 2.0 2020 Public open space (HIL C)**	**MW04**		**MW05**	
							MW04_0.1	**MW04_1.0**	**MW05_0.1**	**MW05_1.4**
Misc.										
Inorganics										
Moisture (%)	%	0.1					2.3	13.3	9.2	20.1
PFAS - Perfluoroalkyl Sulfonic Acids										
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002					-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	1	0.14		1	0.0009	<0.0002	0.0046	<0.0002
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005					-	-	-	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002				1	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Carboxylic Acids										
Perfluorobutanoic acid (PFBA)	mg/kg	0.001					<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10		50	10	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide										
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids										
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005
PFAS - Sums										
PFAS (Sum of Total)	mg/kg	0.0002					0.0009	<0.0002	0.0046	<0.0002
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002					0.0009	<0.0002	0.0046	<0.0002
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005					-	-	-	-
Sum of PFHxS and PFOS	mg/kg	0.0002			14	1	0.0009	<0.0002	0.0046	<0.0002
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005					-	-	-	-

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife diet (Avian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife(Mammalian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Industrial/ commercial (HIL D)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Public open space (HIL C)
28/06/2023, SA MFS Site Specific Criteria - Metropolitan (Staffed)

							Field ID	MW06_0.1	MW06_0.5	MW06_1.6	Historic Results	BH01_0.4-0.5	BH01_1.7-1.8	BH01_2.7-2.8
							Date	19 Sep 2024	19 Sep 2024	19 Sep 2024		16 Oct 2023	16 Oct 2023	16 Oct 2023
							Lab Report Number	EM2416252	EM2418759	EM2416252		EM2318553	EM2318553	EM2318553
	Unit	EQL	PFAS NEMP 2.0 2020 Ecological direct exposure	PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites	SA MFS Site Specific Criteria - Metropolitan (Staffed)	PFAS NEMP 2.0 2020 Public open space (HIL C)		MW06				BH01		
								MW06_0.1	MW06_0.5	MW06_1.6		BH01_0.4-0.5	BH01_1.7-1.8	BH01_2.7-2.8
Misc.														
Inorganics														
Moisture (%)	%	0.1						11.2	17.0	17.2		8.7	14.6	18.1
PFAS - Perfluoroalkyl Sulfonic Acids														
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002						-	<0.0002	-		-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	1	0.14		1		0.0037	0.0003	<0.0002		0.0085	0.0011	0.0006
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005						-	<0.0005	-		-	-	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002				1		<0.0002	<0.0002	<0.0002		0.0011	0.0010	0.0005
PFAS - Perfluoroalkyl Carboxylic Acids														
Perfluorobutanoic acid (PFBA)	mg/kg	0.001						<0.001	<0.001	<0.001		<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002						0.0011	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002						0.0002	<0.0002	<0.0002		<0.0002	0.0004	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002						0.0007	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10		50	10		0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide														
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002						<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids														
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005						<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005
PFAS - Sums														
PFAS (Sum of Total)	mg/kg	0.0002						0.0059	0.0003	<0.0002		0.0096	0.0025	0.0011
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002						0.0041	0.0003	<0.0002		0.0096	0.0025	0.0011
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005						-	-	-		-	-	-
Sum of PFHxS and PFOS	mg/kg	0.0002			14	1		0.0037	0.0003	<0.0002		0.0096	0.0021	0.0011
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005						-	-	-		-	-	-

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife diet (Avian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife(Mammalian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Industrial/ commercial (HIL D)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Public open space (HIL C)
28/06/2023, SA MFS Site Specific Criteria - Metropolitan (Staffed)

Field ID							BH02_0.4-0.5	BH02_0.08-0.18	BH02_2.5-2.6	BH03_0.08-0.18	BH03_0.75-0.85	BH03_2.6-2.7	BH03_3.6-3.7
Date							16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023
Lab Report Number							EM2318553	EM2318553	EM2318553	EM2318553	EM2318553	EM2318553	EM2318553
	Unit	**EQL**	**PFAS NEMP 2.0 2020 Ecological direct exposure**	**PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites**	**SA MFS Site Specific Criteria - Metropolitan (Staffed)**	**PFAS NEMP 2.0 2020 Public open space (HIL C)**	**BH02**			**BH03**			
							BH02_0.4-0.5	**BH02_0.08-0.18**	**BH02_2.5-2.6**	**BH03_0.08-0.18**	**BH03_0.75-0.85**	**BH03_2.6-2.7**	**BH03_3.6-3.7**
Misc.													
Inorganics													
Moisture (%)	%	0.1					8.4	5.9	19.3	8.3	13.3	16.1	19.8
PFAS - Perfluoroalkyl Sulfonic Acids													
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002					0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002					-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	1	0.14		1	0.114	0.0114	0.0056	0.0018	0.0165	<0.0002	<0.0002
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005					-	-	-	-	-	-	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002				1	0.0007	<0.0002	0.0004	0.0002	0.0015	0.0004	<0.0002
PFAS - Perfluoroalkyl Carboxylic Acids													
Perfluorobutanoic acid (PFBA)	mg/kg	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002					0.0003	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10		50	10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide													
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids													
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS - Sums													
PFAS (Sum of Total)	mg/kg	0.0002					0.116	0.0114	0.0060	0.0020	0.0187	0.0004	<0.0002
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002					0.115	0.0114	0.0060	0.0020	0.0187	0.0004	<0.0002
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-	-
Sum of PFHxS and PFOS	mg/kg	0.0002			14	1	0.115	0.0114	0.0060	0.0020	0.0180	0.0004	<0.0002
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-	-

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife diet (Avian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife(Mammalian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Industrial/ commercial (HIL D)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Public open space (HIL C)
28/06/2023, SA MFS Site Specific Criteria - Metropolitan (Staffed)

					Field ID	BH04_0.08-0.18	BH04_0.65-0.75	BH04_2.1-2.2	BH05_0.4-0.5	BH05_0.08-0.18	BH05_1.0-1.15	BH05_2.0-2.1
					Date	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023
					Lab Report Number	EM2318553	EM2318553	EM2318553	EM2318553	EM2318553	EM2319478	EM2318553
	Unit	**EQL**	**PFAS NEMP 2.0 2020 Ecological direct exposure**	**PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites**	**SA MFS Site Specific Criteria - Metropolitan (Staffed)**	**PFAS NEMP 2.0 2020 Public open space (HIL C)**	**BH04**			**BH05**			
							BH04_0.08-0.18	**BH04_0.65-0.75**	**BH04_2.1-2.2**	**BH05_0.4-0.5**	**BH05_0.08-0.18**	**BH05_1.0-1.15**	**BH05_2.0-2.1**
Misc.													
Inorganics													
Moisture (%)	%	0.1					4.2	22.4	14.4	11.3	5.8	16.6	23.1
PFAS - Perfluoroalkyl Sulfonic Acids													
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002					<0.0002	0.0019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002					-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002					<0.0002	0.0003	<0.0002	0.0004	0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	1	0.14		1	0.0153	0.0503	<0.0002	0.228	0.0675	0.0011	<0.0002
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005					-	-	-	-	-	-	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002					<0.0002	0.0025	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002				1	0.0005	0.0202	<0.0002	0.0015	0.0007	<0.0002	<0.0002
PFAS - Perfluoroalkyl Carboxylic Acids													
Perfluorobutanoic acid (PFBA)	mg/kg	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002					<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002					<0.0002	0.0024	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10		50	10	<0.0002	0.0005	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002					<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide													
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	0.0012	0.0006	<0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids													
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS - Sums													
PFAS (Sum of Total)	mg/kg	0.0002					0.0158	0.0788	<0.0002	0.232	0.0690	0.0011	<0.0002
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002					0.0158	0.0760	<0.0002	0.230	0.0682	0.0011	<0.0002
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-	-
Sum of PFHxS and PFOS	mg/kg	0.0002			14	1	0.0158	0.0705	<0.0002	0.230	0.0682	0.0011	<0.0002
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-	-

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife diet (Avian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife(Mammalian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Industrial/ commercial (HIL D)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Public open space (HIL C)
28/06/2023, SA MFS Site Specific Criteria - Metropolitan (Staffed)

						Field ID	BH06_0.6-0.7	BH06_0.08-0.18	BH06_1.2-1.3	BH06_2.9-3.0	BH07_0.08-0.18	BH07_0.65-0.75	BH07_2.9-3.0
						Date	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023	16 Oct 2023
						Lab Report Number	EM2318553	EM2318553	EM2319478	EM2318553	EM2318553	EM2318553	EM2318553
	Unit	**EQL**	**PFAS NEMP 2.0 2020 Ecological direct exposure**	**PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites**	**SA MFS Site Specific Criteria - Metropolitan (Staffed)**	**PFAS NEMP 2.0 2020 Public open space (HIL C)**	**BH06**				**BH07**		
							BH06_0.6-0.7	**BH06_0.08-0.18**	**BH06_1.2-1.3**	**BH06_2.9-3.0**	**BH07_0.08-0.18**	**BH07_0.65-0.75**	**BH07_2.9-3.0**
Misc.													
Inorganics													
Moisture (%)	%	0.1					8.7	5.2	13.0	17.5	6.6	8.9	16.8
PFAS - Perfluoroalkyl Sulfonic Acids													
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002					0.0015	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002					-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002					0.0057	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	1	0.14		1	0.228	0.0052	0.0057	0.0016	0.0018	0.0130	<0.0002
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005					-	-	-	-	-	-	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002					0.0021	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002				1	0.0309	<0.0002	0.0008	<0.0002	0.0004	0.0134	<0.0002
PFAS - Perfluoroalkyl Carboxylic Acids													
Perfluorobutanoic acid (PFBA)	mg/kg	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002					0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002					0.0040	<0.0002	0.0005	<0.0002	<0.0002	0.0005	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10		50	10	0.0024	<0.0002	<0.0002	<0.0002	<0.0002	0.0012	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002					0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide													
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids													
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS - Sums													
PFAS (Sum of Total)	mg/kg	0.0002					0.275	0.0052	0.0070	0.0016	0.0022	0.0299	<0.0002
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002					0.268	0.0052	0.0070	0.0016	0.0022	0.0281	<0.0002
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-	-
Sum of PFHxS and PFOS	mg/kg	0.0002			14	1	0.259	0.0052	0.0065	0.0016	0.0022	0.0264	<0.0002
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-	-

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife diet (Avian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife(Mammalian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Industrial/ commercial (HIL D)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Public open space (HIL C)
28/06/2023, SA MFS Site Specific Criteria - Metropolitan (Staffed)

Field ID							BH08_0.08-0.18	BH08_0.55-0.65	BH08_2.2-2.3	MW01_0.4-0.5	MW01_0.25-0.35	MW01_2.4-2.5
Date							16 Oct 2023	16 Oct 2023	16 Oct 2023	17 Oct 2023	17 Oct 2023	17 Oct 2023
Lab Report Number							EM2318553	EM2318553	EM2318553	EM2318553	EM2318553	EM2318553
	Unit	**EQL**	**PFAS NEMP 2.0 2020 Ecological direct exposure**	**PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites**	**SA MFS Site Specific Criteria - Metropolitan (Staffed)**	**PFAS NEMP 2.0 2020 Public open space (HIL C)**	**BH08**			**MW01**		
							BH08_0.08-0.18	**BH08_0.55-0.65**	**BH08_2.2-2.3**	**MW01_0.4-0.5**	**MW01_0.25-0.35**	**MW01_2.4-2.5**
Misc.												
Inorganics												
Moisture (%)	%	0.1					7.4	6.7	15.3	7.8	8.9	19.4
PFAS - Perfluoroalkyl Sulfonic Acids												
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002					-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	1	0.14		1	0.0007	0.0100	<0.0002	0.0660	0.0023	0.0003
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005					-	-	-	-	-	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002				1	<0.0002	0.0009	<0.0002	0.0004	<0.0002	<0.0002
PFAS - Perfluoroalkyl Carboxylic Acids												
Perfluorobutanoic acid (PFBA)	mg/kg	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002					<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10		50	10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide												
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids												
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS - Sums												
PFAS (Sum of Total)	mg/kg	0.0002					0.0007	0.0112	<0.0002	0.0669	0.0023	0.0003
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002					0.0007	0.0112	<0.0002	0.0664	0.0023	0.0003
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-
Sum of PFHxS and PFOS	mg/kg	0.0002			14	1	0.0007	0.0109	<0.0002	0.0664	0.0023	0.0003
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife diet (Avian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife(Mammalian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Industrial/ commercial (HIL D)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Public open space (HIL C)
28/06/2023, SA MFS Site Specific Criteria - Metropolitan (Staffed)

						Field ID	MW02_0.08-0.18	MW02_3.3-3.4	MW02_04.-0.5	MW03_0.01-0.1	MW03_0.4-0.5	MW03_2.9-3.0
						Date	17 Oct 2023	17 Oct 2023	17 Oct 2023	17 Oct 2023	17 Oct 2023	17 Oct 2023
						Lab Report Number	EM2318553	EM2318553	EM2318553	EM2318553	EM2318553	EM2318553
	Unit	**EQL**	**PFAS NEMP 2.0 2020 Ecological direct exposure**	**PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites**	**SA MFS Site Specific Criteria - Metropolitan (Staffed)**	**PFAS NEMP 2.0 2020 Public open space (HIL C)**	**MW02**			**MW03**		
							MW02_0.08-0.18	**MW02_3.3-3.4**	**MW02_04.-0.5**	**MW03_0.01-0.1**	**MW03_0.4-0.5**	**MW03_2.9-3.0**
Misc.												
Inorganics												
Moisture (%)	%	0.1					4.9	24.8	6.9	24.6	10.3	17.2
PFAS - Perfluoroalkyl Sulfonic Acids												
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002					<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002					-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	1	0.14		1	0.0004	<0.0002	0.0025	0.0094	0.0011	<0.0002
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005					-	-	-	-	-	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002				1	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	0.0002
PFAS - Perfluoroalkyl Carboxylic Acids												
Perfluorobutanoic acid (PFBA)	mg/kg	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002					<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	10		50	10	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide												
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002					<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids												
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PFAS - Sums												
PFAS (Sum of Total)	mg/kg	0.0002					0.0004	<0.0002	0.0029	0.0094	0.0013	0.0002
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002					0.0004	<0.0002	0.0029	0.0094	0.0013	0.0002
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-
Sum of PFHxS and PFOS	mg/kg	0.0002			14	1	0.0004	<0.0002	0.0025	0.0094	0.0013	0.0002
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005					-	-	-	-	-	-

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife diet (Avian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure for wildlife(Mammalian diet)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Industrial/ commercial (HIL D)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Public open space (HIL C)
28/06/2023, SA MFS Site Specific Criteria - Metropolitan (Staffed)

						Field ID	MW01	MW02	MW03	MW04	MW05	MW06	Historic Results	MW01	MW02	MW03
						Date	09 Oct 2024	09 Oct 2024	09 Oct 2024	09 Oct 2024	09 Oct 2024	09 Oct 2024		24 Oct 2023	24 Oct 2023	24 Oct 2023
						Lab Report Number	EM2417598	EM2417598	EM2417598	EM2417598	EM2417598	EM2417598		EM2319054	EM2319054	EM2319054
Chem name	**Unit**	**EQL**	NHMRC 2019 Recreational Water PFAS Guidelines	PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems	PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems	PFAS NEMP 2.0 2020 Health Drinking Water	MW01	MW02	MW03	MW04	MW05	MW06		MW01	MW02	MW03
Acidity & Alkalinity																
Alkalinity (Carbonate as CaCO3)	mg/L	1					-	-	-	<1	-	-		-	-	-
Alkalinity (Bicarbonate as CaCO3)	mg/L	1					-	-	-	991	-	-		-	-	-
Alkalinity (Hydroxide as CaCO3)	mg/L	1					-	-	-	<1	-	-		-	-	-
Alkalinity (total as CaCO3)	mg/L	1					-	-	-	991	-	-		-	-	-
Major Ions														-	-	-
Calcium (filtered)	mg/L	1					-	-	-	21	-	-		-	-	-
Magnesium (filtered)	mg/L	1					-	-	-	41	-	-		-	-	-
Potassium (filtered)	mg/L	1					-	-	-	17	-	-		-	-	-
Sodium (filtered)	mg/L	1					-	-	-	1,270	-	-		-	-	-
Chloride	mg/L	1					-	-	-	862	-	-		-	-	-
Sulfate (filtered)	mg/L	1					-	-	-	419	-	-		-	-	-
Cations Total	meq/L	0.01					-	-	-	60.1	-	-		-	-	-
Anions Total	meq/L	0.01					-	-	-	52.8	-	-		-	-	-
Ionic Balance	%	0.01					-	-	-	6.43	-	-		-	-	-
Nutrients														-	-	-
Ammonia as N	mg/L	0.01					-	-	-	<0.01	-	-		-	-	-
Nitrate (as N)	mg/L	0.01					-	-	-	0.06	-	-		-	-	-
Nitrite (as N)	mg/L	0.01					-	-	-	<0.01	-	-		-	-	-
Nitrogen (Total Oxidised) (as N)	mg/L	0.01					-	-	-	0.06	-	-		-	-	-
Metals														-	-	-
Arsenic	mg/L	0.001					-	-	-	0.001	-	-		-	-	-
Arsenic (filtered)	mg/L	0.001					-	-	-	<0.001	-	-		-	-	-
Cadmium	mg/L	0.0001					-	-	-	<0.0001	-	-		-	-	-
Cadmium (filtered)	mg/L	0.0001					-	-	-	<0.0001	-	-		-	-	-
Chromium (III+VI)	mg/L	0.001					-	-	-	0.001	-	-		-	-	-
Chromium (III+VI) (filtered)	mg/L	0.001					-	-	-	<0.001	-	-		-	-	-
Copper	mg/L	0.001					-	-	-	0.001	-	-		-	-	-
Copper (filtered)	mg/L	0.001					-	-	-	<0.001	-	-		-	-	-
Lead	mg/L	0.001					-	-	-	<0.001	-	-		-	-	-
Lead (filtered)	mg/L	0.001					-	-	-	<0.001	-	-		-	-	-
Mercury	mg/L	0.0001					-	-	-	<0.0001	-	-		-	-	-
Mercury (filtered)	mg/L	0.0001					-	-	-	<0.0001	-	-		-	-	-
Nickel	mg/L	0.001					-	-	-	0.002	-	-		-	-	-
Nickel (filtered)	mg/L	0.001					-	-	-	<0.001	-	-		-	-	-
Zinc	mg/L	0.005					-	-	-	0.012	-	-		-	-	-
Zinc (filtered)	mg/L	0.005					-	-	-	<0.005	-	-		-	-	-
PFAS - Perfluoroalkyl Sulfonic Acids														-	-	-
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005					0.0092	0.0035	0.0809	0.0021	0.0019	0.0046		<0.02	<0.02	0.16
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
Perfluorononane sulfonate (PFNS)	µg/L	0.001					-	-	-	-	-	-				
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005					0.0035	<0.0005	0.0114	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0001		0.13	0.00023	0.07	0.178	0.0071	0.0439	0.0012	0.0017	0.0020		0.06	0.04	0.04
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.001					-	-	-	-	-	-		-	-	-
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005					0.0081	0.0013	0.0820	0.0009	<0.0005	0.0015		<0.02	<0.02	0.16
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005				0.07	0.0593	0.0040	0.325	0.0043	0.0019	0.0065		0.08	0.05	0.64
PFAS - Perfluoroalkyl Carboxylic Acids																
Perfluorobutanoic acid (PFBA)	µg/L	0.002					0.0032	<0.0020	0.0236	<0.0020	<0.0020	<0.0020		<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005					0.0006	<0.0005	0.0143	<0.0005	<0.0005	<0.0005		<0.02	<0.02	0.02
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005					0.0032	0.0006	0.0847	0.0009	<0.0005	<0.0005		<0.02	<0.02	0.19
Perfluorononanoic acid (PFNA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	10	220	19	0.56	0.0024	<0.0005	0.0118	0.0019	<0.0005	<0.0005		<0.01	<0.01	0.02
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005					0.0009	<0.0005	0.0221	<0.0005	<0.0005	<0.0005		<0.02	<0.02	0.04
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.05	<0.05	<0.05
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
PFAS - Perfluoroalkyl Sulfonamide																
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	µg/L	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005					<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.02	<0.02	<0.02
PFAS - Fluorotelomer Sulfonic Acids																
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.001					<0.001	0.005	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001					<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.05	<0.05	<0.05
PFAS - Sums																
PFAS (Sum of Total)	µg/L	0.0002					0.272	0.0237	0.729	0.0113	0.0055	0.0167		0.14	0.09	1.27
PFAS (Sum of Total)(WA DER List)	µg/L	0.0002					0.257	0.0202	0.606	0.0104	0.0055	0.0131		0.14	0.09	1.11
Sum of US EPA PFAS (PFOS + PFOA)*	µg/L	0.001					-	-	-	-	-	-		-	-	-
Sum of PFHxS and PFOS	µg/L	0.0002	2			0.07	0.237	0.0111	0.369	0.0055	0.0036	0.0085		0.14	0.09	0.68
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	µg/L	0.001					-	-	-	-	-	-		-	-	-
PFAS TOPA - Perfluoroalkyl Carboxylic Acids																
PFBA (TOPA)	µg/L	0.01					0.01	-	-	-	-	<0.01		-	-	-
PFPeA (TOPA)	µg/L	0.002					0.006	-	-	-	-	<0.002		-	-	-
PFHxA (TOPA)	µg/L	0.002					0.032	-	-	-	-	<0.002		-	-	-
PFHpA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFOA (TOPA)	µg/L	0.002	10[#4]	220[#4]	19[#4]	0.56[#5]	0.003	-	-	-	-	<0.002		-	-	-
PFNA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFDA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFUnDA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFDoDA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFTrDA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFTeDA (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
PFAS TOPA - Perfluoroalkyl Sulfonic Acids														-	-	-
PFBS (TOPA)	µg/L	0.002					0.009	-	-	-	-	0.007		-	-	-
PFPeS (TOPA)	µg/L	0.002					0.016	-	-	-	-	0.002		-	-	-
PFHxS (TOPA)	µg/L	0.002				0.07[#5]	0.066	-	-	-	-	0.010		-	-	-
PFHpS (TOPA)	µg/L	0.002					0.005	-	-	-	-	<0.002		-	-	-
PFOS (TOPA)	µg/L	0.002		0.13[#4]	0.00023[#4]	0.07[#5]	0.153	-	-	-	-	<0.002		-	-	-
PFDS (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFAS TOPA - Perfluoroalkyl Sulfonamide														-	-	-
FOSA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
MeFOSA (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
EtFOSA (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
MeFOSAA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
MeFOSE (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
EtFOSE (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
EtFOSAA (TOPA)	µg/L	0.002					<0.002	-	-	-	-	<0.002		-	-	-
PFAS TOPA - Fluorotelomer Sulfonic Acids														-	-	-
4:2 FTS (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
6:2 FTS (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
8:2 FTS (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
10:2 FTS (TOPA)	µg/L	0.005					<0.005	-	-	-	-	<0.005		-	-	-
PFAS TOPA - Sums														-	-	-
Sum of TOP C4 - C14 as Fluorine (TOPA)	µg/L	0.002					0.191	-	-	-	-	0.011		-	-	-
Sum of PFHxS and PFOS (TOPA)	µg/L	0.002	2[#4]			0.07[#5]	0.219	-	-	-	-	0.010		-	-	-
Sum of PFAS	µg/L	0.002					0.300	-	-	-	-	0.019		-	-	-
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfo_	µg/L	0.002					0.300	-	-	-	-	0.019		-	-	-

Comments
#1 Not specifically guideline value: >500mg/L can have purgative effects
#2 Guideline value calculated by dividing Nitrate (as Nitrate) value (50 mg/L) by 4.427
#3 Guideline value calculated by dividing Nitrite (as Nitrite) value (30 mg/L) by molecular weight (3.2967033).
#4 Indicative purposes only
#5 For indicative purposes only
#6 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Environmental Standards
National Health and Medical Research Council, January 2022, ADWG 2011 Recreational (v3.7 updated 2022)
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems
HEPA, January 2020, PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Health Drinking Water
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water

						Date	25 Sep 2024	25 Sep 2024	25 Sep 2024
						Field ID	SW01	SW02	SW_MYDRANT
						Lab Report Number	EM2416582	EM2416582	EM2416582
	Unit	**EQL**	PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems	PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems	PFAS NEMP 2.0 2020 Health Drinking Water	NHMRC 2019 Recreational Water PFAS Guidelines	SW01	SW02	SW_MYDRANT
Nutrients									
Ammonia as N	mg/L	0.01					0.04	0.26	-
Nitrate (as N)	mg/L	0.01					0.02	0.04	-
Nitrite (as N)	mg/L	0.01					<0.01	0.02	-
Nitrogen (Total Oxidised) (as N)	mg/L	0.01					0.02	0.06	-
Nitrite (as NO2-)	mg/L	0.05					<0.05	0.06	-
Metals									
Arsenic	mg/L	0.001					<0.001	0.002	-
Arsenic (filtered)	mg/L	0.001					<0.001	0.002	-
Cadmium	mg/L	0.0001					<0.0001	<0.0001	-
Cadmium (filtered)	mg/L	0.0001					<0.0001	<0.0001	-
Chromium (III+VI)	mg/L	0.001					0.003	0.003	-
Chromium (III+VI) (filtered)	mg/L	0.001					<0.001	<0.001	-
Copper	mg/L	0.001					0.019	<0.001	-
Copper (filtered)	mg/L	0.001					0.009	0.002	-
Lead	mg/L	0.001					0.006	0.002	-
Lead (filtered)	mg/L	0.001					<0.001	0.001	-
Mercury	mg/L	0.0001					<0.0001	<0.0001	-
Mercury (filtered)	mg/L	0.0001					<0.0001	<0.0001	-
Nickel	mg/L	0.001					0.002	0.001	-
Nickel (filtered)	mg/L	0.001					<0.001	<0.001	-
Zinc	mg/L	0.005					0.005	0.030	-
Zinc (filtered)	mg/L	0.005					0.008	0.033	-
PFAS - Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.13	0.00023	0.07		<0.01	0.02	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01			0.07		<0.01	0.02	<0.01
PFAS - Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	µg/L	0.1					<0.1	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	220	19	0.56	10	<0.01	<0.01	<0.01
Perfluoropentanoic acid (PFPeA)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05					<0.05	<0.05	<0.05
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02					<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02					<0.02	<0.02	<0.02
PFAS - Perfluoroalkyl Sulfonamide									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05					<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02					<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05					<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05					<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02					<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	µg/L	0.05					<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02					<0.02	<0.02	<0.02
PFAS - Fluorotelomer Sulfonic Acids									
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.05					<0.05	<0.05	<0.05
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05					<0.05	<0.05	<0.05
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.05					<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05					<0.05	<0.05	<0.05
PFAS - Sums									
PFAS (Sum of Total)	µg/L	0.01					<0.01	0.04	<0.01
PFAS (Sum of Total)(WA DER List)	µg/L	0.01					<0.01	0.04	<0.01
Sum of PFHxS and PFOS	µg/L	0.01			0.07	2	<0.01	0.04	<0.01

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems
HEPA, January 2020, PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Health Drinking Water
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water

Appendix H

Sampling Records

GHD

Groundwater Gauging Sheet

Client: MFS	WL Meter Type: Dip / Fox / (Int.Fce) / Gge
Project: CAMDEN PARK SUPP DSI	Date: 09/10/24
Job No.: 12645793	Time: 08:30
Location: 65 MORPHETT RD, CAMDEN PARK	Sampler: TW/AV

Location / Bore ID	Stick up (m)	SWL (mbTOC)	Thickness of NAPL (mm)	Comment
MW01	–	1.184	–	TOTAL DEPTH: 3.465
MW03	–	1.733	–	TOTAL DEPTH: 3.528
MW02	–	1.218	–	TOTAL DEPTH: 3.955
MW04	–	1.185	–	TOTAL DEPTH: 3.565
MW06	–	1.744	–	TOTAL DEPTH: 3.952
MW05	–	1.643	–	TOTAL DEPTH: 3.794

SURFACE WATER SAMPLING RECORD

PROJECT NO.	12645793	DATE:	25/09/2024
PROJECT NAME:	MFS CAMDEN PARK SUPP DSI	TIME:	12:30
CLIENT:	MFS	SAMPLING OFFICERS:	TW/JA
SITE:	SW01		
COORDINATES/GPS *(If Applicable)*			
SAMPLING METHOD *(ie grab, bucket)*	GRAB		
DETAILED SAMPLE LOCATION DESCRIPTION	STORMWATER PIT DIRECTLY OUTSIDE OF STATION (ALBERT AV)		

ENVIRONMENTAL OBSERVATIONS

WEATHER	LIGHT DRIZZLE
VEGETATION	NONE (BUILT-UP AREA)
SLOPE	N/A
EROSION	N/A
OTHER	CONCRETE STORMWATER PIT CLEAR, LOW SED LOAD, LOW TURBIDITY, NO ODOUR, NO SHEEN

FIELD MEASUREMENTS

TEMPERATURE (°C)	17.2
CONDUCTIVITY (uS/cm)	728
pH	7.63
DO (ppm)	8.77
REDOX (mV)	-61.7

HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available)	SIMULATED RUN-OFF/RAINFALL EVENT INGRESS OF WATER IN STORMWATER PITS FROM HYDRANT.
CROSS SECTION WIDTH (m)	
DEPTH (m)	
OTHER	

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS

FIELD SUPERVISOR T. WILSON CHECKED (SIGN & DATE)

SURFACE WATER SAMPLING RECORD

PROJECT NO.	12645793	DATE:	25/09/2024
PROJECT NAME:	MFS CAMDEN PARK SUPP DSI	TIME:	14:30
CLIENT:	MFS	SAMPLING OFFICERS:	TW/JA
SITE:	SW02		
COORDINATES/GPS *(If Applicable)*			
SAMPLING METHOD *(ie grab, bucket)*	GRAB		
DETAILED SAMPLE LOCATION DESCRIPTION	BROWNHILL CREEK STORMWATER INLET POINT		

ENVIRONMENTAL OBSERVATIONS

WEATHER	LIGHT DRIZZLE
VEGETATION	GRASSES AND HERBACEOUS PLANTS
SLOPE	STEEP (GABION)
EROSION	NONE
OTHER	GABION ADJACENT TO PEDESTRIAN BRIDGE PALE YELLOW, LOW SED LOAD, LOW TURBIDITY, NO ODOUR, NO SHEEN

FIELD MEASUREMENTS

TEMPERATURE (°C)	17.1
CONDUCTIVITY (uS/cm)	923
pH	6.89
DO (ppm)	7.39
REDOX (mV)	-58.8

HYDROLOGICAL DATA

FLOW MEASUREMENT (or stream height if rating table available)	
CROSS SECTION WIDTH (m)	~25-30m
DEPTH (m)	~1.5m
OTHER	

SAMPLE NO.	NO. OF CONTAINERS	PRESERVATIVE	DUPLICATE	COMMENTS

FIELD SUPERVISOR T. WILSON CHECKED (SIGN & DATE)

Purging and Sampling Record

Bore ID: MW04

Job Information	Sampling Information	Bore Information
Client: MFS	Purge Method: Bailer	SWL(mbTOC): 1.168 m
Project: Camden Park Sapp DSI	Sample Method: —	Screen: From: ..... to ..... m
Proj. No.: 12645793	WQ Meter Type: YSI Pro	NAPL Check: .....
Sampler: TW/JA	Flow Cell: Y / (N) Pump Depth: ..... m	Ref.datum: .....
Date: 25/09/24	WLevel Meter Type: Dip / Fox / (Int.Fce) / Gge	Bore Depth: 3.548 m
Round	Field Filtered? Y / (N) (filter vessel, disposable filter/syringe)	

Logic Check: —
Stick Up: ..... m
Bore Diam.: 50 mm
Well Cap Secure? Yes

Time (24H)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings)	-		+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
11:30									3.548 - 1.18 : 2.38 . 9.76
									14.28 - Target purge volume
11:35	5 5	18.7	7.33	3153	4.35	179.7	1.969	*Sheen	Low Sed, high Turbidity, Clear - Pale Brown, No odour
11:40	5 10	19.0	7.35	3478	5.10	171.4	2.672	"	" " " "
11:45	4 14	19.1	7.40	4228	4.72	177.7	2.932	"	" " Pale Brown " "
11:55	4 18	19.1	7.41	4681	4.04	192.4	2.782		CLEAR TO PALE BROWN, LOW SED LOAD, MED TURBIDITY,
									NO ODOUR, NO SHEEN

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Purging and Sampling Record

Bore ID: MW05

Job Information
Client: MFS
Project: CAMDEN PARK SUPP DSI
Proj. No.: 12645793
Sampler: TW/JA
Date: 25/09/24
Round: -

Sampling Information
Purge Method: BAILER
Sample Method:
WQ Meter Type: YSI PRO
Flow Cell: Y / (N) Pump Depth: - m
WLevel Meter Type: Dip / Fox / (Int.Fce) / Gge
Field Filtered? Y / N (filter vessel, disposable filter/syringe)

Bore Information
SWL(mbTOC): 1.694 m Logic Check: -
Screen: From: to m Stick Up: - m
NAPL Check: - Bore Diam.: 50 mm
Ref.datum: - Well Cap Secure? YES
Bore Depth: 3.998 m

Time (24H.)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings)	-	-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
09:00									BORE VOL. : 2.304 x 2 = 4.608L
									TARGET PURGE VOL = 13.8L
09:15	4 TOT. 4	19.3	6.93	41873	3.14	175.6	1.791		PALE BROWN, HIGH SED LOAD, HIGH TURBIDITY,
									NO ODOUR, NO SHEEN
09:23	4 8	19.3	6.92	42409	3.16	170.9	1.901		PALE BROWN, HIGH SED LOAD, HIGH TURBIDITY,
									NO ODOUR, NO SHEEN
09:30	4 12	19.2	6.97	38903	3.18	193.2	1.855		PALE BROWN, MED SED LOAD, HIGH TURBIDITY,
									NO ODOUR, NO SHEEN
09:35	4 16	19.2	6.98	38925	3.13	206.2	1.851		PALE BROWN, MED SED LOAD, HIGH TURBIDITY,
									NO ODOUR, NO SHEEN
09:40	4 20	19.3	7.00	44343	6.76	207.6	1.969		Pale Brown, Med Sed load, High Turbidity
									no odour, no sheen
09:45	10 34	19.3	7.37	42604	5.39	228.2	2.215		" " " " " " "
									" " " "
09:50	10 44	19.4	7.06	44462	4.07	227.9	2.308		PALE BROWN, LOW-MED SED LOAD, HIGH TURBIDITY

Field QA Checks:
Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes
Casing Int. Dia (mm) 50 100 150
Vol (L/m of casing) 2.0 7.9 17.7
*Double for gravel pack

10:00 10 54 19.4 7.04 44221 3.88 249.4 2.221 PALE BROWN, LOW-MED SED LOAD, HIGH TURBIDITY NO ODOUR, NO SHEEN

Purging and Sampling Record

Bore ID: MW06

Job Information

Client: MES
Project: CAMDEN PARK SUPP DSI
Proj. No.: 12645793
Sampler: TW/JA
Date: 25/09/24
Round

Sampling Information

Purge Method: BAILER
Sample Method: –
WQ Meter Type: YSI PRO
Flow Cell: Y / (N) Pump Depth: – m
WLevel Meter Type: Dip / Fox / (Int.Fce) / Gge
Field Filtered? Y / (N) (filter vessel, disposable filter/syringe)

Bore Information

SWL(mbTOC): 1.784 m Logic Check: –
Screen: From: ..... to ..... m Stick Up: – m
NAPL Check: ..... Bore Diam.: 50 mm
Ref.datum: ..... Well Cap Secure? YES
Bore Depth: 4.055 m

Time (24H.)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (µS/cm)	Dis.Oxygen (mg/L)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):	-		+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
10:25									BORE VOL.: 2.271 x 2 = 4.542
									TARGET PURGE VOL: 13.6L
10:30	5 TOT. 5	18.1	7.07	8704	2.91	206.2	2.093		PALE BROWN, HIGH SED LOAD, HIGH TURBIDITY, NO ODOUR, NO SHEEN
10:35	5 10	18.0	7.11	8792	10.92	189.9	2.259		" " " " "
10:40	5 15	18.0	7.18	7867	5.88	186.2	2.289		PALE BROWN, MED SED LOAD, HIGH TURBIDITY, NO ODOUR, NO SHEEN
10:45	5 20	18.1	7.09	7924	4.78	180.4	2.395		" " " " "
10:50	5 25	18.1	7.12	7777	5.22	172.5	2.586		" " " " "
10:55	5 30	18.1	7.11	7845	3.83	185.5	2.522		Low-Med Sed, Pale Brown, High Turb, No odour, no sheen
11:00	5 35	18.1	7.11	7819	3.86	183.8	2.604		" " " " "

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
Decontamination as per GHD procedure? Y / N
Was sampling equipment pre-cleaned? Y / N
COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Preservatives													

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack

Monitoring Round: 12645793_09 Oct 2024

Location Visit

Site ID	Camden Park MFS	**Monitoring Zone**	
Location Code	MW01		
Arrival Date/Time	09 Oct 2024 09:38AM		
Comments			
Weather	Fine		

Monitoring Well Details

Type	Flush-mount (Gatic)
Condition	Good condition
Description (colour, labels, etc.)	White cover

Groundwater Data

Well	-	**Date/Time**	09 Oct 2024 09:39AM
Measurement Method	Interface Probe	**Dry?**	No
Water Depth (mbTOC)	1.184	**Well Depth (mbTOC)**	3.465
NAPL Depth (mbTOC)			
Comments			

Sample Data

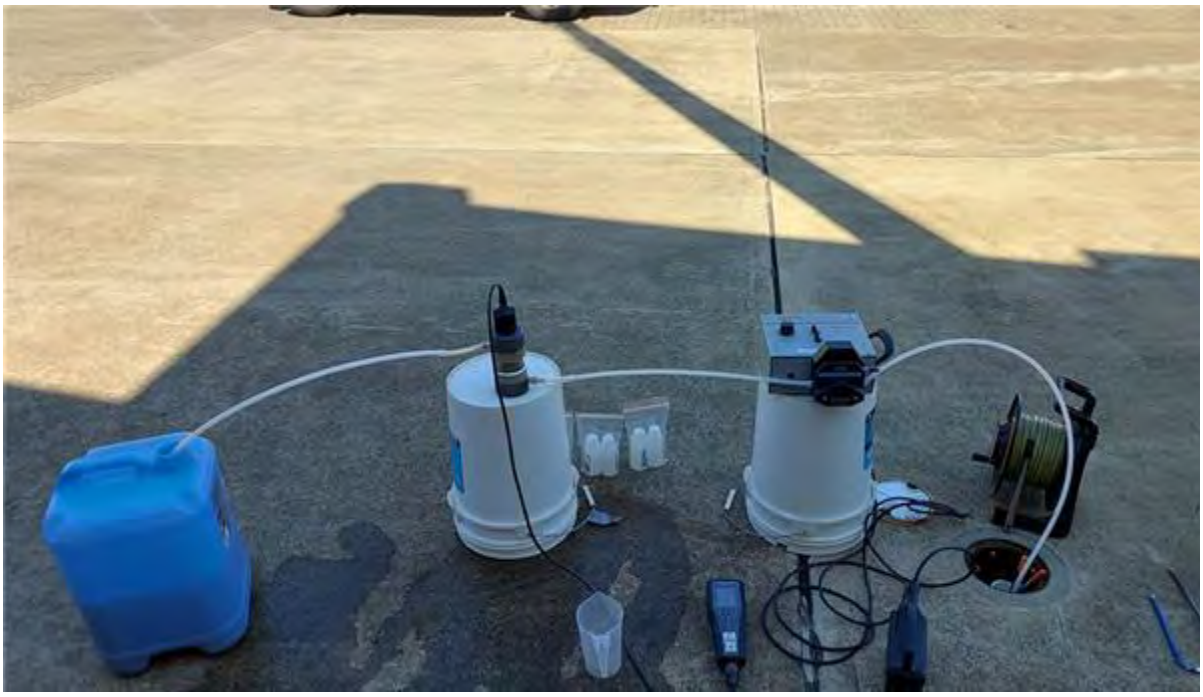
Well	-
Sampled Date/Time	09 Oct 2024 09:40AM
Sampled By	Terrence Wilson
Sample ID	MW01
Duplicate Sample IDs (if applicable)	FD01, FS01
Matrix Type	Water
Sample Depth	3.3
Purge/Sampling Method	Low flow
Sample Comments	Clear to pale brown, low turbidity, low sediment load, no odour, no sheen

Field Chemistry

Time	PURGE VOLUME	Purge SWL (mbTOC) (field)	Temperature (Field)	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	TDS (Field)
	L	m bTOC	°C	pH units	µS/cm	mg/L	mV	mg/L
09:40AM	2	1.771	18.3	7.33	8823	10.2	53.9	-
09:54AM	3	1.77	18.5	7.33	8784	10.1	55.7	-
09:59AM	3	1.762	18.5	7.34	8723	10.3	55.9	-
Stabilisation *			±0.2oC (3)	±0.05pH Units (3)	±3% (3)	±10% (3)	±10mV (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Photos



Monitoring Round: 12645793_09 Oct 2024

Location Visit

Site ID	Camden Park MFS	**Monitoring Zone**	
Location Code	MW03		
Arrival Date/Time	09 Oct 2024 10:38AM		
Comments			
Weather	Fine		

Monitoring Well Details

Type	Flush-mount (Gatic)
Condition	Good condition
Description (colour, labels, etc.)	White cover

Groundwater Data

Well	-	**Date/Time**	09 Oct 2024 10:38AM
Measurement Method	Interface Probe	**Dry?**	No
Water Depth (mbTOC)	1.733	**Well Depth (mbTOC)**	3.528
NAPL Depth (mbTOC)			
Comments			

Sample Data

Well	-
Sampled Date/Time	09 Oct 2024 10:39AM
Sampled By	Terrence Wilson
Sample ID	MW03
Duplicate Sample IDs (if applicable)	
Matrix Type	Water
Sample Depth	3.4
Purge/Sampling Method	Low flow
Sample Comments	Clear to pale yellow, low turbidity, low sediment load, no odour, no sheen

Field Chemistry

Time	PURGE VOLUME	Purge SWL (mbTOC) (field)	Temperature (Field)	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	TDS (Field)
	L	m bTOC	°C	pH units	µS/cm	mg/L	mV	mg/L
10:39AM	3	1.923	18.9	7.09	12906	10.2	52.8	-
10:45AM	3	1.944	18.9	7.09	13167	10.1	53	-
10:50AM	3	1.961	19	7.08	13275	10	52.9	-
Stabilisation *			±0.2oC (3)	±0.05pH Units (3)	±3% (3)	±10% (3)	±10mV (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Photos

Monitoring Round: 12645793_09 Oct 2024

Location Visit

Site ID	Camden Park MFS	**Monitoring Zone**	
Location Code	MW02		
Arrival Date/Time	09 Oct 2024 11:18AM		
Comments			
Weather	Fine		

Monitoring Well Details

Type	Flush-mount (Gatic)
Condition	Other condition (type comments)
Description (colour, labels, etc.)	Rootlets in upper section of screen

Groundwater Data

Well	-	**Date/Time**	09 Oct 2024 11:20AM
Measurement Method	Interface Probe	**Dry?**	No
Water Depth (mbTOC)	1.218	**Well Depth (mbTOC)**	
NAPL Depth (mbTOC)			
Comments			

Sample Data

Well	-
Sampled Date/Time	09 Oct 2024 11:21AM
Sampled By	Terrence Wilson
Sample ID	MW02
Duplicate Sample IDs (if applicable)	
Matrix Type	Water
Sample Depth	3.4
Purge/Sampling Method	Low flow
Sample Comments	Clear to pale yellow. Low turbidity. Low sediments. Rootlets present.

Field Chemistry

Time	PURGE VOLUME	Purge SWL (mbTOC) (field)	Temperature (Field)	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	TDS (Field)
	L	m bTOC	°C	pH units	µS/cm	mg/L	mV	mg/L
11:27AM	2	1.422	19.6	6.97	16276	10.2	50.5	-
11:33AM	4	1.454	19.4	7	15200	10.1	46.5	-
11:37AM	3	1.458	19.4	7.01	14759	10.1	46.1	-
11:41AM	2	1.462	19.4	7.01	14612	10	45.7	-
11:44AM	2	1.46	19.4	7.02	14466	10	45.5	-
Stabilisation *			±0.2oC (3)	±0.05pH Units (3)	±3% (3)	±10% (3)	±10mV (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Photos

Monitoring Round: 12645793_09 Oct 2024

Location Visit

Site ID	Camden Park MFS	**Monitoring Zone**	
Location Code	MW04		
Arrival Date/Time	09 Oct 2024 12:18PM		
Comments			
Weather	Fine		

Monitoring Well Details

Type	Flush-mount (Gatic)
Condition	Good condition
Description (colour, labels, etc.)	White cover

Groundwater Data

Well	-	**Date/Time**	09 Oct 2024 12:18PM
Measurement Method	Interface Probe	**Dry?**	No
Water Depth (mbTOC)	1.185	**Well Depth (mbTOC)**	3.565
NAPL Depth (mbTOC)			
Comments			

Sample Data

Well	-
Sampled Date/Time	09 Oct 2024 12:19PM
Sampled By	Terrence Wilson
Sample ID	MW04
Duplicate Sample IDs (if applicable)	
Matrix Type	Water
Sample Depth	3.4
Purge/Sampling Method	Low flow
Sample Comments	Clear to pale yellow, low turbidity, low sediment load, no odour, no sheen

Field Chemistry

Time	PURGE VOLUME	Purge SWL (mbTOC) (field)	Temperature (Field)	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	TDS (Field)
	L	m bTOC	°C	pH units	µS/cm	mg/L	mV	mg/L
12:19PM	3	1.622	20	7.59	2360	10.2	48.3	-
12:31PM	3	1.946	20	7.52	3628	11.1	44.3	-
12:34PM	3	1.942	19.9	7.53	4247	11.6	44.6	-
12:40PM	2	1.945	20	7.51	4289	11.3	44.5	-
12:44PM	2	1.942	20	7.49	4320	11	44	-
Stabilisation *			±0.2oC (3)	±0.05pH Units (3)	±3% (3)	±10% (3)	±10mV (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Photos

Monitoring Round: 12645793_09 Oct 2024

Location Visit

Site ID	Camden Park MFS	**Monitoring Zone**	
Location Code	MW06		
Arrival Date/Time	09 Oct 2024 01:53PM		
Comments			
Weather	Fine		

Monitoring Well Details

Type	Flush-mount (Gatic)
Condition	Good condition
Description (colour, labels, etc.)	White cover

Groundwater Data

Well	-	**Date/Time**	09 Oct 2024 01:54PM
Measurement Method	Interface Probe	**Dry?**	No
Water Depth (mbTOC)	1.744	**Well Depth (mbTOC)**	3.952
NAPL Depth (mbTOC)			
Comments			

Sample Data

Well	-
Sampled Date/Time	09 Oct 2024 01:55PM
Sampled By	Terrence Wilson
Sample ID	MW06
Duplicate Sample IDs (if applicable)	
Matrix Type	Water
Sample Depth	3.8
Purge/Sampling Method	Low flow
Sample Comments	Initially pale brown. High turbidity. Low sediment load. No odour. No sheen. Later pale brown to clear. Moderate turbidity. Low sediment load. No odour. No sheen.

Field Chemistry

	PURGE VOLUME	Purge SWL (mbTOC) (field)	Temperature (Field)	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	TDS (Field)
Time	**L**	**m bTOC**	**°C**	**pH units**	**µS/cm**	**mg/L**	**mV**	**mg/L**
02:02PM	4	2.029	18.6	7.15	8653	10	55.7	-
02:07PM	2	2.008	18.7	7.14	8655	10	55.1	-
02:11PM	2	2.007	18.7	7.14	8661	10	54.9	-
Stabilisation *			±0.2oC (3)	±0.05pH Units (3)	±3% (3)	±10% (3)	±10mV (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Photos

Monitoring Round: 12645793_09 Oct 2024

Location Visit

Site ID	Camden Park MFS	**Monitoring Zone**	
Location Code	MW05		
Arrival Date/Time	09 Oct 2024 02:38PM		
Comments			
Weather	Fine		

Monitoring Well Details

Type	Flush-mount (Gatic)
Condition	Good condition
Description (colour, labels, etc.)	White cover

Groundwater Data

Well	-	**Date/Time**	09 Oct 2024 02:39PM
Measurement Method	Interface Probe	**Dry?**	No
Water Depth (mbTOC)	1.643	**Well Depth (mbTOC)**	3.794
NAPL Depth (mbTOC)			
Comments			

Sample Data

Well	-
Sampled Date/Time	09 Oct 2024 02:47PM
Sampled By	Terrence Wilson
Sample ID	MW05
Duplicate Sample IDs (if applicable)	
Matrix Type	Water
Sample Depth	3.6
Purge/Sampling Method	Low flow
Sample Comments	Pale yellow to clear, low turbidity, low sediment load, no odour, no sheen

Field Chemistry

Time	PURGE VOLUME	Purge SWL (mbTOC) (field)	Temperature (Field)	pH (Field)	Electrical conductivity (field)	Dissolved Oxygen (Field)	Redox (Field)	TDS (Field)
	L	m bTOC	°C	pH units	µS/cm	mg/L	mV	mg/L
02:47PM	5	1.78	19.9	7.11	47808	10.8	57.9	-
02:54PM	4	1.795	19.9	7.12	48070	10.6	56.6	-
03:00PM	3	1.793	19.8	7.14	48142	10.5	55.9	-
Stabilisation *			±0.2oC (3)	±0.05pH Units (3)	±3% (3)	±10% (3)	±10mV (3)	

Green indicates readings have stabilised according to the criteria shown, red indicates they haven't. The number in brackets indicates the number of readings that need to meet the criteria for the readings to be considered stable.

Photos

LINKUP CONSTRUCTION SURVEYS PTY LTD

`

To: Terrence Wilson
Company: GHD
Phone: 0413 476 581

From: Lincoln Jeffery
Phone: 0414 840 569
Email: Lincoln@linkupconstructionsurveys.com.au

Date: 4/11/2024

Monitoring well coordinates –
MFS Camden Park – 65 Morphett Rd, Camden Park

Well or Bore No.	Easting GDA20	Northing GDA20	R.L. Top of Casing A.H.D.	Natural Surface A.H.D.
MW01	275193.215	6127911.153	5.994	6.061
MW02	275168.541	6127894.268	6.003	6.122
MW03	275148.528	6127933.116	6.411	6.534
MW04	275250.802	6127881.125	5.737	5.874
MW05	275001.022	6127942.667	5.602	5.696
MW06	275111.030	6128000.258	5.919	6.030

All Survey information was based from the GDA20 Z54 grid system and Australian Height Datum (AHD), Triangulated from Network Survey Marks.

Appendix I

Calibration Certificates

Oil / Water Interface Meter

Instrument **Interface Meter (50M)**
Serial No. **HS2-00363**

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	4x >1.5V
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Tested by: **Trent Chase**

Test date: **23/09/2024**

Next Test due: **22/03/2025**

Oil / Water Interface Meter 20.0 4102024A

Instrument Waterra Interface Meter (50m)
Serial No. HS2-00363

Air-Met Scientific Pty Ltd
1800 000 744

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: Trent Chase

Calibration date: **4/10/2024**

Next calibration due: **2/04/2025**

Multi Parameter Water Meter

Instrument YSI Quatro Pro Plus
Serial No. 18G103308

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. D.O		0 ppm		391223	0 ppm
2. Conductivity		2760 uS/cm @ 25 °C		401089	2755 uS/cm
3. pH7		pH 7.00		393774	pH 7.00
4. pH4		pH 4.00		399527	pH 3.99
5. ORP mV		247.2 mV @ 15.2 °C		406331/398193	247.0 mV
7. Temp °C		19.4			15.2

Calibrated by: **Rebecca Massoud**

Calibration date: **28-Aug-24**

Next calibration due: **24-Feb-25**

Multi Parameter Water Meter 99.0 4102024A

Instrument **YSI Pro Plus**
Serial No. **18L101822**

Air-Met Scientific Pty Ltd
1800 000 744

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. D.O		0ppm		416791	0ppm
2. Conductivity		2760µS		424499	2760µS
3. pH7		pH 7		419529	pH 7
4. pH4		pH 4		422643	pH 4
5. Temp °C		20°C		MultTherm	20°C
6. ORP mV		234mV		MultTherm	234mV

Calibrated by: Jaspher Olanio

Calibration date: **4-Oct-24**

Next calibration due: **2-Apr-25**

Appendix J

QA/QC Report

Appendix J - Quality Assurance and Quality Control Report

1. GHD QA/QC Assessment

1.1 Laboratories and data set

All samples recovered during the supplementary detailed site investigation (DSI) were submitted to ALS and Eurofins, which are National Association of Testing Authorities (NATA) accredited laboratories, accredited to perform the required analysis.

The selected laboratories conducted all the requested analyses in accordance with the guidelines outlined in NEPM 1999 (as amended 2013).

The laboratories used for sample analysis are set out in Table 1.1.

Table 1.1 Analytical laboratories and reports

Laboratory	Primary or Secondary	NATA Certified for Analysis Requested	Report No
ALS	Primary (groundwater, surface water and soil)	Yes	EM2416252 EM2416582 EM2417598 EM2418759
Eurofins	Secondary (groundwater, surface water and soil)	Yes	1142062 1148891

The primary results for the supplementary DSI are outlined in the Tabulated Analytical Results section of the supplementary DSI report, and the laboratory certificates of analysis are located in the appendices. The QA/QC results are outlined in the tables at the end of this QA/QC report.

The data quality assessment detailed in the following pages refers to the data provided in these laboratory reports and the results of the Q/AQC analysis. Please note this QA/QC report excludes results and laboratory reports from historical sampling events.

1.2 Data quality indicators

Table 1.2 sets out the QA/QC Data Quality Indicators (DQIs) used in the sampling investigation and outcomes for each of these for each DQI.

Table 1.2 Summary of QA/QC compliance for sampling

Item	Objective	Outcome	References
GHD Internal Procedures			
Comparison of field and analytical data	Agreement between visual and olfactory evidence with laboratory results	Achieved	Tabulated Analytical Results; Certificates of Analysis; Borelogs/Field Records.
Calibration of field instruments	Meet calibration specifications	Achieved	Copies of calibration certificates.
Chain of Custody documentation	Supply Chain of Custody Documentation with all samples	Achieved	Copies of Chain of Custody Documentation.
Sample analysis and extraction holding times	Comply with holding times	Achieved	ALS/Eurofins Laboratory Quality Control Reports.

Analysis of inter- and intra-laboratory duplicate samples	Analysis of duplicate samples in 10% of primary samples	Achieved	AS4482.1-2005 and US EPA NEPM 1999 (as amended 2013) and Eurofins/ALS certificates of analysis. PFAS NEMP 2.0
Analysis of duplicate and split samples	Frequencies and RPDs within guideline and internal laboratory limits (RPD of 0-30%)	Minor non-conformances as stated in Table 2.1	AS4482.1-2005 and US EPA NEPM 1999 (as amended 2013) and Eurofins/ALS certificates of analysis. PFAS NEMP 2.0
External Laboratory Procedures			
Analysis of laboratory method blanks	No contamination of blanks	Achieved	ALS/Eurofins Laboratory Quality Control Reports.
Analysis of laboratory spike recoveries	Recoveries within the laboratory specified recovery limits	Achieved	Eurofins/ALS Laboratory Quality Control Reports
Analysis of laboratory internal duplicates	Frequencies and RPDs within guideline and internal laboratory limits (RPD of 0-30%)	Minor non-conformances	NEPM 1999 (as amended 2013). Eurofins/ALS Laboratory Quality Control Reports

QA/QC assessment method

Established QA/QC procedures to assess data quality were maintained throughout the project. The QA/QC program undertaken as part of the assessment by GHD included the following:

- Use of appropriately qualified and trained staff.
- Preservation of samples with ice during transport from the field to the laboratory.
- Transportation of samples with accompanying chain-of-custody documentation.
- Compliance with sample holding times.
- Review of results of blind duplicate samples.
- Review of results of split duplicate samples.
- Review of results of field blank samples.
- Review of internal analysis of laboratory duplicates, spikes and blanks.

The QC program employed during this investigation was in accordance with the general requirements set out in the Australian Standard AS4482.1 (2005) and the NEMP 2.0 (2020) QC samples provide information that discounts or potentially identifies errors due to possible sources of cross contamination, inconsistencies in sampling and analytical techniques used. The QC program completed included the collection and analysis of duplicate samples, rinsate samples and trip blank samples as described below:

- **Split duplicate samples**: These are duplicate samples split in the field, with one sample being sent to a secondary laboratory for analysis. The same parameters are analysed utilising similar analytical techniques.
- **Blind duplicate samples**: These are coded duplicate samples submitted to the primary laboratory for analysis as individual samples without any indication to the laboratory that they have been duplicated.
- **Rinsate samples**: A sample of deionised water collected from equipment used during sampling to indicate whether cross contamination occurred from equipment.
- **Trip Blanks**: A laboratory supplied uncontaminated (blank) deionised water sample which is placed within the ice chest with the samples. This sample is analysed at the laboratory to indicate if contamination occurred during transportation of samples.

A quantitative measure of the duplicate sample results was made using calculated relative percentage difference (RPD) values for each chemical. The RPD values were calculated using the following equation.

$$RPD(\%) = \frac{(C_o - C_s)}{\left(\frac{C_o + C_s}{2}\right)} \times 100$$

Where C_o = reported concentration of the chemical of interest from the original parent sample

Cs = reported concentration of the chemical of interest from the duplicate sample

2. GHD QA/QC

2.1 Duplicate samples

Elevated RPD values for duplicate and split samples are summarised in Table 2.1 and presented in full in at the end of this appendix report.

Table 2.1 Blind duplicate and split duplicate RPD exceedance summary - soil

Primary Sample	QC Sample (Duplicate or Split)	Analyte	Primary result (mg/kg)	Duplicate Result (mg/kg)	Split result (mg/kg)	Highest RPD (%)
Soil						
MW06	FD02 (D) FS02 (S)	PFOS	0.0003	0.0002	<0.005	40
		Sum of PFHxS and PFOS	0.0003	0.0002	<0.005	40
		PFAS (Sum of Total) (WA DER List)	0.0003	0.0002	<0.01	40
Groundwater						
MW01	FD01 (D) FS01 (S)	PFPeS	0.0081	0.0070	0.008[#1]	15
		PFPeA	0.0009	0.0008	0.001	12
		PFOA	0.0024	0.0020	0.003[#1]	22

2.1.1 Soil blind duplicate and split duplicate

The majority of RPDs were calculated within acceptable limits, with the exception of some PFAS analytes in the duplicate sample. The elevated RPDs can be attributed to the following:

– Low analyte concentrations close to or below the LOR.

The majority of results being within the same order of magnitude, and the relatively minor concentrations reported for the majority of elevated RPDs, GHD considers the data set to be of an acceptable quality for which to base the assessment.

2.1.2 Water blind duplicate and split duplicate samples

The majority of RPDs were calculated within acceptable limits, with the exception of some PFAS analytes in one split sample. The elevated RPDs can be attributed to the following:

– Low analyte concentrations close to or below the LOR.

2.1.3 Blind duplicate and split duplicate sample frequency

A summary of the blind and split duplicate sample frequency is presented in Table 2.2.

Table 2.2 Blind duplicate and split duplicate frequency summary

Primary Samples Count	Blind Duplicate Samples Count	Percentage of Primary Samples	Split Samples Count	Percentage of Primary Samples
Soil				
7	1	14.3%	1	14.3%
Water				
6	1	16.6%	1	16.6%

The QC rates for duplicate frequency across matrix types generally met the data quality objectives. GHD considers the data to be of satisfactory precision on which to base the assessment.

2.2 Rinsate blank

Five rinsate blank samples were collected during the investigation and analysed for PFAS. All concentrations of PFAS analytes were reported below the laboratory LOR for analyses carried out, meeting the Data Quality Objectives of the project. The tabulated results for rinsate samples are presented at the end of this appendix report.

3. Laboratory QA/QC

3.1 Internal duplicates

All RPDs for laboratory internal duplicates from the ALS and Eurofins reports were within the laboratory nominated acceptable ranges.

3.2 Matrix spikes

All laboratory matrix spikes from the laboratory reports were within the nominated acceptable ranges.

3.3 Laboratory control spikes

All laboratory control spikes from the laboratory reports were within the nominated acceptable ranges.

3.4 Method blanks

All reported method blank concentrations were less than their respective laboratory LOR and indicating that potential laboratory cross contamination was unlikely to have occurred.

3.5 Compliance with holding times

All analytes were extracted and analysed within both ALS' and Eurofins' technical holding times, with the exception of the soil sample MW06_0.5, which reported a holding time breach for PFAS (ALS EM2418759) due to the sample was on hold and analysed at a different date. All other PFAS analytes were within laboratory accepted holding times, meeting the Data Quality Objectives of the project.

3.6 Laboratory QA/QC summary

GHD considers the data to be of satisfactory precision on which to base the assessment.

3.7 Conclusion

Based on the QA/QC program undertaken during the sampling programs, the data obtained during the assessment is considered to be of an acceptable standard on which to base interpretations and draw conclusions regarding the environmental status of the site.

Location Code			MW06			MW06			
Date			19 Sep 2024	19 Sep 2024		19 Sep 2024	19 Sep 2024		
Field ID			MW06_0.5	FD02		MW06_0.5	FS02		
Lab Report Number			EM2418759	EM2416252		EM2418759	1142062		
Matrix Type			Soil	Soil		Soil	Soil		
Sample Type			Normal	Field_D	RPD	Normal	Interlab_D	RPD	
	Unit	EQL							
Misc.									
% Moisture_	%	1	-	-	-	-	27	-	
Inorganics									
Moisture (%)	%	0.1	17.0	15.8	7	17.0	-	-	
PFAS - Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorononane sulfonate (PFNS)	mg/kg	0.0002	<0.0002	-	-	<0.0002	<0.005	0	
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	0.0003	0.0002	**40**	0.0003	<0.005	0	
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.0005	<0.0005	-	-	<0.0005	<0.005	0	
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
PFAS - Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	mg/kg	0.001	<0.001	<0.001	0	<0.001	<0.005	0	
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorononanoic acid (PFNA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
PFAS - Perfluoroalkyl Sulfonamide									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.01	0	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	

		Location Code	MW06			MW06			
		Date	19 Sep 2024	19 Sep 2024		19 Sep 2024	19 Sep 2024		
		Field ID	MW06_0.5	FD02		MW06_0.5	FS02		
		Lab Report Number	EM2418759	EM2416252		EM2418759	1142062		
		Matrix Type	Soil	Soil		Soil	Soil		
		Sample Type	Normal	Field_D	RPD	Normal	Interlab_D	RPD	
	Unit	EQL							
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.01	0	
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	
PFAS - Fluorotelomer Sulfonic Acids									
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.01	0	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	
PFAS - Sums									
PFAS (Sum of Total)	mg/kg	0.0002	0.0003	0.0002	**40**	0.0003	<0.05	0	
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002	0.0003	0.0002	**40**	0.0003	<0.01	0	
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005	-	-	-	-	<0.005	-	
Sum of PFHxS and PFOS	mg/kg	0.0002	0.0003	0.0002	**40**	0.0003	<0.005	0	
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005	-	-	-	-	<0.005	-	

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 30 (1 - 10 x EQL); 30 (10 - 30 x EQL); 30 (> 30 x EQL))**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory**

			Location Code	MW01			MW01	MW01	
			Date	09 Oct 2024	09 Oct 2024		09 Oct 2024	09 Oct 2024	
			Field ID	MW01	FD01		MW01	FS01	
			Lab Report Number	EM2417598	EM2417598		EM2417598	1148891	
			Matrix Type	Water	Water		Water	Water	
			Sample Type	Normal	Field_D	RPD	Normal	Interlab_D	RPD
	Unit	EQL							
PFAS - Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	0.0092	0.0080	14	0.0092	0.009[#1]	2
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0
Perfluorononane sulfonate (PFNS)	µg/L	0.001	-	-	-	-	<0.001	-
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005	0.0035	0.0030	15	0.0035	0.003[#1]	15
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0001	0.178	0.162	9	0.178	0.19	7
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.001	-	-	-	-	0.005	-
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005	0.0081	0.0070	15	0.0081	0.008[#1]	1
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	0.0593	0.0526	12	0.0593	0.064[#1]	8
PFAS - Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	µg/L	0.002	0.0032	0.0028	13	0.0032	<0.005	0
Perfluorodecanoic acid (PFDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	0.0006	0.0006	0	0.0006	<0.001	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	0.0032	0.0028	13	0.0032	0.005	**44**
Perfluorononanoic acid (PFNA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	0.0024	0.0020	18	0.0024	0.003[#1]	22
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	0.0009	0.0008	12	0.0009	0.001	11
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0
PFAS - Perfluoroalkyl Sulfonamide									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0
PFAS - Fluorotelomer Sulfonic Acids									
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0
PFAS - Sums									
PFAS (Sum of Total)	µg/L	0.0002	0.272	0.245	10	0.272	0.288	6
PFAS (Sum of Total)(WA DER List)	µg/L	0.0002	0.257	0.232	10	0.257	0.272	6
Sum of US EPA PFAS (PFOS + PFOA)*	µg/L	0.001	-	-	-	-	0.193	-
Sum of PFHxS and PFOS	µg/L	0.0002	0.237	0.215	10	0.237	0.254	7
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	µg/L	0.001	-	-	-	-	0.257	-
PFAS TOPA - Perfluoroalkyl Carboxylic Acids									
PFBA (TOPA)	µg/L	0.01	0.01	-	-	0.01	-	-
PFPeA (TOPA)	µg/L	0.002	0.006	-	-	0.006	-	-
PFHxA (TOPA)	µg/L	0.002	0.032	-	-	0.032	-	-
PFHpA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFOA (TOPA)	µg/L	0.002	0.003	-	-	0.003	-	-
PFNA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFDA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFUnDA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFDoDA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFTrDA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFTeDA (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
PFAS TOPA - Perfluoroalkyl Sulfonic Acids									
PFBS (TOPA)	µg/L	0.002	0.009	-	-	0.009	-	-
PFPeS (TOPA)	µg/L	0.002	0.016	-	-	0.016	-	-
PFHxS (TOPA)	µg/L	0.002	0.066	-	-	0.066	-	-
PFHpS (TOPA)	µg/L	0.002	0.005	-	-	0.005	-	-
PFOS (TOPA)	µg/L	0.002	0.153	-	-	0.153	-	-
PFDS (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFAS TOPA - Perfluoroalkyl Sulfonamide									
FOSA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
MeFOSA (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
EtFOSA (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
MeFOSAA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
MeFOSE (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
EtFOSE (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
EtFOSAA (TOPA)	µg/L	0.002	<0.002	-	-	<0.002	-	-
PFAS TOPA - Fluorotelomer Sulfonic Acids									
4:2 FTS (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
6:2 FTS (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
8:2 FTS (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
10:2 FTS (TOPA)	µg/L	0.005	<0.005	-	-	<0.005	-	-
PFAS TOPA - Sums									
Sum of TOP C4 - C14 as Fluorine (TOPA)	µg/L	0.002	0.191	-	-	0.191	-	-
Sum of PFHxS and PFOS (TOPA)	µg/L	0.002	0.219	-	-	0.219	-	-
Sum of PFAS	µg/L	0.002	0.300	-	-	0.300	-	-
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfo_	µg/L	0.002	0.300	-	-	0.300	-	-

Comments

#1 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**

****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 30 (1 - 10 x EQL); 30 (10 - 30 x EQL); 30 (> 30 x EQL))**

*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory**

		Date	19 Sep 2024
		Field ID	TB01
		Lab Report Number	EM2416252
		Matrix Type	Soil
		Sample Type	Trip_B
	Unit	EQL	
Inorganics			
Moisture (%)	%	0.1	**2.5**
PFAS - Perfluoroalkyl Sulfonic Acids			
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002	<0.0002
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002	<0.0002
PFAS - Perfluoroalkyl Carboxylic Acids			
Perfluorobutanoic acid (PFBA)	mg/kg	0.001	<0.001
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002	<0.0002
Perfluorononanoic acid (PFNA)	mg/kg	0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	<0.0002
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002	<0.0002
PFAS - Perfluoroalkyl Sulfonamide			
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002	<0.0002
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005	<0.0005
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002	<0.0002
PFAS - Fluorotelomer Sulfonic Acids			
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005	<0.0005
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005	<0.0005
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005	<0.0005
PFAS - Sums			
PFAS (Sum of Total)	mg/kg	0.0002	<0.0002
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002	<0.0002
Sum of PFHxS and PFOS	mg/kg	0.0002	<0.0002

		Date	18 Sep 2024	19 Sep 2024	25 Sep 2024	25 Sep 2024	09 Oct 2024	09 Oct 2024
		Field ID	RB01	RB02	FB01	RB01	FB01	RB01
		Lab Report Number	EM2416252	EM2416252	EM2416582	EM2416582	EM2417598	EM2417598
		Matrix Type	Water	Water	Water	Water	Water	Water
		Sample Type	Rinsate	Rinsate	Field_B	Rinsate	Field_B	Rinsate
	Unit	EQL						
PFAS - Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02	<0.02	-	-	-	-
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0002	<0.01	<0.01	<0.01	<0.01	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02	<0.02	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	<0.01	<0.01	<0.01	<0.01	<0.0005	<0.0005
PFAS - Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	µg/L	0.002	<0.1	<0.1	<0.1	<0.1	<0.0020	<0.0020
Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005
Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	<0.01	<0.01	<0.01	<0.01	<0.0005	<0.0005
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	<0.02	<0.02	<0.02	<0.02	<0.0005	<0.0005
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	-	-	-	-
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
PFAS - Perfluoroalkyl Sulfonamide								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05	<0.05	<0.05	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	-	-	-	-
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	µg/L	0.05	<0.05	<0.05	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<0.02	<0.02	-	-	-	-
PFAS - Fluorotelomer Sulfonic Acids								
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001	<0.05	<0.05	<0.05	<0.05	<0.001	<0.001

			Date	18 Sep 2024	19 Sep 2024	25 Sep 2024	25 Sep 2024	09 Oct 2024	09 Oct 2024
			Field ID	RB01	RB02	FB01	RB01	FB01	RB01
			Lab Report Number	EM2416252	EM2416252	EM2416582	EM2416582	EM2417598	EM2417598
			Matrix Type	Water	Water	Water	Water	Water	Water
			Sample Type	Rinsate	Rinsate	Field_B	Rinsate	Field_B	Rinsate
	Unit	EQL							
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001		<0.05	<0.05	<0.05	<0.05	<0.001	<0.001
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.001		<0.05	<0.05	<0.05	<0.05	<0.001	<0.001
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001		<0.05	<0.05	<0.05	<0.05	<0.001	<0.001
PFAS - Sums									
PFAS (Sum of Total)	µg/L	0.01		<0.01	<0.01	-	-	-	-
PFAS (Sum of Total)(WA DER List)	µg/L	0.0002		<0.01	<0.01	<0.01	<0.01	<0.0002	<0.0002
Sum of PFHxS and PFOS	µg/L	0.0002		<0.01	<0.01	<0.01	<0.01	<0.0002	<0.0002

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