



MFS Camden Park Station

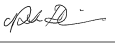
Detailed Site Investigation

South Australian Metropolitan Fire Service

February 20, 2024

→ The Power of Commitment



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Executive Summary

Background

GHD Pty Ltd (GHD) was engaged by the South Australian (SA) Metropolitan Fire Service (MFS) to undertake a Detailed Site Investigation (DSI) for the Camden Park Fire Station, located at 65 Morphett Road, Camden Park, South Australia 5038 (the site).

In 2022, GHD undertook a site history review of 17 MFS sites (GHD 2022) and inspections of eight metropolitan sites to support environmental risk profiling using a multi-criteria analysis approach. The work was required to address the potential risks associated with former use of aqueous film-forming foam (AFFF) containing per- and poly-fluoroalkyl substances (PFAS). The sites were prioritised to assist with the implementation of appropriate assessment and management measures to address the potential PFAS risks. The Camden Park station was identified as high priority due to a history of AFFF use, identified soil impacts, the expected shallow groundwater and the proximity of the nearest irrigation bore, surface water and residential properties.

Objectives

The objective of this investigation is to address the SA EPA's requirement to undertake a DSI in order to assess:

- The nature and extent of PFAS contamination, both on- and off-site
- The potential risks to human health and the environment associated with identified PFAS contamination on-site, in the context of continued industrial use
- The potential risks to human health and the environment associated with PFAS contamination migrating off-site, in the context of the relevant land uses and environments

Scope of Work

The following scope of works was undertaken in general accordance with the Sampling and Analysis Quality Plan (SAQP) (GHD 2023):

- Advancement of eight (8) soil bores
- Installation and development of three (3) groundwater monitoring wells
- Surveying of the three (3) newly installed groundwater monitoring wells relative to Australian Height Datum (AHD)
- Disposal of waste soil and groundwater by a licenced contractor
- Preparation of this DSI report

Determination of Site Contamination

Based on the information presented in this DSI report, it is considered that site contamination exists in relation to PFAS impacts identified in soil and groundwater. Soil impacts are primarily observed adjacent to the southern stormwater pits where surface water from appliance washdown/flushing area activities was directed.

Conclusions

The following conclusions were drawn based on findings of this detailed site investigation:

- 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 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 as part of this investigation, PFAS concentrations were reported as continuing to decrease below 0.4 - 0.7 m bgl. There were no reported concentrations which were above the criteria below this depth
- Concentrations above the Tier 1 ADWG recommendations for human health drinking water were reported in all monitoring wells for Sum of PFHxS and PFOS ($\mu\text{g/L}$), with exceedance values ranging from 0.09 $\mu\text{g/L}$ (MW02) to 0.68 $\mu\text{g/L}$ (MW03), when compared to the adopted criteria of 0.07 $\mu\text{g/L}$. This represents an increase in concentration in the direction of the inferred groundwater flow
- PFOS concentrations above the PFAS NEMP Freshwater - 99% for high conservation value systems criteria (0.00023 $\mu\text{g/L}$) was also reported in all three monitoring wells ranging from 0.04 - 0.06 $\mu\text{g/L}$
- MW03 is located on the northwest corner of the site, in the inferred direction of groundwater flow, down-gradient from the washdown area and associated site drainage. As MW03 reported the highest concentration for Sum of PFHxS and PFOS, it is likely that PFAS contamination extends off-site to the north-west

Recommendations

To mitigate the potential ecological and human health exposure risks (i.e., those with confirmed or possible complete source-pathway-receptor linkages) identified, the following recommendations are proposed:

- Further intrusive assessment works to delineate the nature and spatial extent of the contamination off-site to the north-west including:
 - Installation of 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 within the vicinity of the site to evaluate the potential exposure risk attributable to the possible use of groundwater for wells with an undefined or domestic purpose

Limitations

This report is subject to, and must be read in conjunction with, the limitations set out in section 1.5 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
ANZG	Australia and New Zealand Guidelines
AWQG	Australian Water Quality Guidelines
BYDA	Before You Dig Australia
CCME	Canadian Council of Ministers of the Environment
CoC	Contaminants of Concern
CSM	Conceptual Site Model
DEW	Department of Environment and Water
DO	Dissolved Oxygen
DQIs	Data Quality Indicators
DSI	Detailed Site Investigation
DWLBC	Department of Water, Land and Biodiversity Conservation
EC	Electrical Conductivity
ECCC	Environment and Climate Change Canada
EPP	Environmental Protection Policy
EV	Environmental Values
GAR	South Australian <i>Guidelines for the Assessment and Remediation of Site Contamination 2019</i>
GHD	GHD Pty Ltd
HEPA	Heads of Environment Protection Authorities Australia
HDPE	High-Density Polyethylene
HIL	Human Health Investigation Level
IBC	Intermediate Bulk Container
LOR	Limit of Reporting
m bgl	Metres Below Ground Level
MCA	Multi Criteria Analysis
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
NEPM	National Environment Protection Measure

Abbreviation	Full Form
NHMRC	National Health and Medical Research Council
NSW	New South Wales
PASS	Potential Acid Sulphate Soils
PFAS	Per- and Poly-Fluoroalkyl Substances
PFHxS	Perfluorohexane Sulfonate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PFPeA	Perfluoropentanoic acid
PSI	Preliminary Site Investigation
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percentage Difference
SA EPA	South Australian Environment Protection Authority
SAQP	Sampling and Analysis Quality Plan
SARIG	South Australian Resources Information Gateway
SPR	Source-Pathway-Receptor
SSHIL	Site Specific Health Investigation Levels
SWL	Standing Water Level
TDS	Total Dissolved Solids
TOC	Top of Casing
WQEPP	South Australian <i>Environmental Protection (Water Quality) Policy</i> 2015

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1. Introduction

GHD Pty Ltd (GHD) was engaged by the South Australian (SA) Metropolitan Fire Service (MFS) to undertake a Detailed Site Investigation (DSI) for the Camden Park Fire Station, located at 65 Morphett Road, Camden Park, South Australia 5038 (the site).

This DSI is limited to potential impacts from the use of aqueous film-forming foam (AFFF) containing per- and poly-fluoroalkyl substances (PFAS) to address the action required by the SA Environment Protection Authority (EPA) letter GENI 62917 (refer to Appendix A). Other potential contaminating activities and related contaminants of concern (CoC) were not included in this assessment.

1.1 Background

The Camden Park Fire Station was officially opened in 1993 as a fire station. It is staffed by fulltime firefighters who provide 24-hour emergency response, 365 days of the year.

Historically, MFS have used AFFF containing PFAS at the site during training activities. MFS commenced phasing out the use of firefighting foams containing perfluorooctane sulfonate (PFOS) in 2007 and perfluorooctanoic acid (PFOA) in 2014 after consultation with the Australasian Fire and Emergency Service Authorities Council (AFAC) and the SA EPA. MFS replaced all firefighting foam in 2016 to ensure that only products designated fluorine-free were in use. During 2017/2018, MFS also removed all fire extinguishers containing PFAS from their sites.

In 2022, GHD undertook a site history review of 17 MFS sites (GHD 2022), and inspections of eight metropolitan sites to support environmental risk profiling using a multi-criteria analysis approach. The work was required to address the potential risks associated with former use of AFFF containing PFAS. The sites were prioritised to assist with the implementation of appropriate assessment and management measures to address the potential PFAS risks. The GHD 2022 Report was provided to the SA EPA, who subsequently issued a letter dated 1 February 2023 (EPA GENI 62917) with the requirement of “a plan of proposed works and associated timelines to address the highest risk sites” (refer Appendix A). The Camden Park Fire Station was identified as one of the eight high priority sites.

GHD has completed a Preliminary Site Investigation (PSI) (GHD 2023a) and Sampling Analysis and Quality Plan (SAQP) (GHD 2023b) for the site. This DSI report was prepared to close out the data gaps identified in the PSI and SAQP and the scope of works was in accordance with the SAQP.

1.2 Objective

The objective of this investigation is to address the SA EPA’s requirement to undertake a DSI in order to assess:

- The nature and extent of PFAS contamination, both on- and off-site
- The potential risks to human health and the environment associated with identified PFAS contamination on-site, in the context of continued industrial use
- The potential risks to human health and the environment associated with PFAS contamination migrating off-site, in the context of the relevant land uses and environments

1.3 Scope of works

The following scope of works was undertaken in general accordance with the SAQP (GHD 2023b):

- Advancement of eight soil bores on-site, with associated soil logging, target depth sampling and PFAS analysis
- Concrete coring at soil bore locations as required, with associated sampling and PFAS analysis
- Installation and development of three permanent on-site groundwater monitoring wells
- Surveying of the newly installed groundwater monitoring wells relative to Australian Height Datum (AHD)
- Disposal of waste soil and groundwater by a licensed contractor

- Development of a Conceptual Site Model (CSM), comprising an assessment of PFAS source areas, pathways, and receptors
- Preparation of this DSI report

1.4 Person requesting works

The investigation was requested by:

Mr Eero Haatainen, Acting Deputy Chief Officer, SA MFS, 99 Wakefield St, Adelaide SA 5000.

1.5 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 objectives 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.

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

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.

2. Site information

2.1 Site identification

A summary of general site information is provided in Table 2.1.

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 m ²
Site Elevation	8 m Australian Height Datum (AHD)

2.2 Site description

2.2.1 Site inspection and description

The MFS Camden Park Fire Station is located on the corner of Morphett Road and Albert Avenue, approximately 1.0 km north of the Morphett Road/Anzac Highway intersection. The site is used as an operational fire station staffed in four shifts. During a site inspection undertaken in June 2022, as part of the PSI (GHD 2023a), the site included the following buildings and features:

- One main building, located centrally on the site, which housed an engine bay, administrative offices and living quarters
- A storage shed located along the southern boundary of the site in the southeast corner
- No fruit trees or poultry were present on-site

Site Photographs from the site inspection are presented in Appendix B.

2.2.2 Historical Use and Storage of PFAS

A questionnaire regarding the historical use of AFFF at the site was circulated to MFS staff. Three surveys were completed, one survey was completed on 20 June 2022 by Station Officers and the remainder were completed by officers on 1 and 2 July 2022 as part of the multi-criteria analysis (MCA). The station officers who had been working at the site for a number of years provided relevant anecdotal information on the site history in an interview during the site inspection. Locations related to the historical use and storage of PFAS can be found in the GHD (2023a) PSI. A copy of the site surveys can be found in Appendix C.

The key points regarding the historical use and storage of PFAS containing AFFF at the site are summarised as follows:

- Although there were no training exercises conducted at the site, the use of AFFF was noted as early as 1994. There was only one incident reported where an AFFF tank of an appliance at the site had to be drained. A large volume of rinse water with foam concentrate contained in the tank was released in the appliance flushing area/rear yard

- Storage of AFFF on-site was within the firefighting appliances as well as a special storage pod just south of the building's veranda, where 1000 L IBCs of AFFF were stored in case of major incidents. It is understood that the foam storage pod was moved to the Adelaide Fire Station at an unknown date. AFFF contained on the foam storage pod was never handled at Camden Park Fire Station
- Appliances and equipment were washed down/flushed on the concrete pad and paved area along the eastern portion of the site (rear yard) and water was collected in the stormwater infrastructure on-site. It is noted that washing of appliances and equipment are not considered to be a risk of releasing AFFF. However, flushing of the AFFF system on the appliance and any equipment would likely have resulted in the release of AFFF

2.3 Surrounding land use

A summary of the uses of the land surrounding the site is provided in Table 2.2. Surrounding land use and zoning are shown in Figure 1 at the end of the report.

Table 2.2 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. Previous investigations

Previous PFAS investigations at the Camden Park Fire Station have been carried out by GHD in 2019, 2022 and 2023. Documentation 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 Station, Preliminary Site Investigation, July 2023
- GHD (2023b) MFS Camden Park Station, Sampling and Analysis Quality Plan (SAQP), September 2023

Locations sampled at the Camden Park Fire Stations as part of these investigations are presented in Figure 2 at the end of the report. Summaries of these investigations are presented in the sections below.

3.1 GHD (2019) MFS State-wide Appliance and Station Sampling

GHD (2019) reported that the Camden Park Fire Station was part of the 2019 environmental investigations carried out at 35 fire stations across South Australia to assess PFAS concentrations that may remain in firefighting appliances, accessible soil, and any biota (edible vegetation and poultry) if present.

Key outcomes from the GHD (2019) included:

- Two surface soil samples (CAMDEN_1 and CAMDEN_2) collected from a small patch of inedible vegetation located in the middle of the carpark, which is an area where AFFF has historically been sprayed. Both samples exceeded the PFAS NEMP Ecological indirect exposure guideline, with one sample also exceeding the PFAS NEMP public open space guideline for Sum of PFHxS and PFOS
- Both soil samples were below the PFAS NEMP Human Health Investigation Level (HIL) B assessment criteria
- No edible vegetation was observed to be grown on-site
- No groundwater, surface water or concrete samples were sampled as part of the investigation.

It is noted that the 2018 PFAS NEMP guidelines were used in this report, which were superseded by the 2020 PFAS NEMP 2.0. However, this has no practical impact on the purposes of this report as the guideline values for soil at commercial/industrial properties are the same in both versions of the PFAS NEMP. In the 2020 PFAS NEMP 2.0, environmental guideline values that refer to the sum of PFOS and perfluorohexane sulfonate (PFHxS) now explicitly apply not only to the sum of the two but also to PFOS only and to PFHxS only, which was only inferred in the 2018 PFAS NEMP 1.0. It should be noted that there is a new version of the PFAS NEMP currently in review (3.0).

3.2 GHD (2022) MFS 17 Fire Stations PFAS Risk Profiling

The Camden Park fire station was part of a 2022 desktop risk assessment and MCA carried out at 17 MFS fire stations across South Australia to support appropriate risk management approaches associated with potential or identified PFAS contamination. The 17 sites required for prioritisation, including Camden Park, were identified by the SA EPA in the letter GENI 62485 dated 21 October 2021 and is included Appendix A.

The report presented the methodology and findings of the PFAS risk profiling for the 17 MFS fire stations with identified PFAS impacts in soil. The desktop review focused on identifying historical activities that may represent a source of PFAS contamination and potentially sensitive human or ecological receptors in the vicinity of the sites as well as understanding potential source-pathway-receptor linkages that may be present.

The report provided a summary of the sites' prioritisation for further assessment based on their potential to cause harm to the environment and/or human health. The Camden Park MFS fire station was classified as high-risk with high priority for further investigation of PFAS contamination for the following reasons:

- On-site historical bulk storage of AFFF concentrate was stored in 1000 L IBCs
- Expected shallow groundwater beneath the site (1.8 - 6.0 m bgl)
- The relatively short distance to the closest groundwater bore (50 m south with an unlisted purpose)
- The relatively short distance to the closest surface water body (0.3 km south and 0.9 km south-west Sturt River)

3.3 GHD (2023a) MFS Camden Park Station, Preliminary Site Investigation

A PSI was undertaken to review historical site activities which may have contributed to PFAS contamination at the site and potentially off-site.

The potential risks to human health and the environment outlined in the Preliminary Conceptual Site Model (PCSM) were as follows:

- Exposure of site users, visitors, maintenance, and construction workers to PFAS via direct dermal contact with contaminated soil, incidental ingestion of contaminated soil or inhalation of contaminated soil/dust from disturbed soils
- Leaching of PFAS from contaminated soils or concrete/paved surfaces followed by migration to surface water and/or groundwater
- Consumption of contaminated groundwater extracted off-site for domestic/drinking purposes
- Consumption of edible vegetation grown off-site where plants were irrigated with contaminated groundwater or where plant roots accessed shallow contaminated groundwater
- Incidental ingestion of contaminated groundwater extracted off-site for recreational purposes such as filling of swimming pools

The outcomes of these works have been incorporated in the applicable sections of this report.

3.4 GHD (2023b) MFS Camden Park Station, Sampling and Analysis Quality Program (SAQP)

Following finalisation of the PSI, an SAQP was prepared to undertake intrusive investigations for the delineation of the lateral and vertical extent of PFAS contamination on- and off-site.

The purpose of the SAQP was to present the scope of work, methodologies, and sampling rationale to be utilised during the further intrusive works for this DSI to meet the investigation objectives.

Based upon the PCSM provided in the PSI, the following data gaps were identified:

- The lateral and vertical extent of PFAS contamination in groundwater has not been determined
- The lateral and vertical extent of PFAS contamination in soil has not been delineated
- The uptake of PFAS by on and off-site vegetation has not been assessed
- The degree of PFAS contamination in on-site concrete and bitumen surfaces and the associated PFAS flux from these materials has not been assessed
- The potential for PFAS to leach from contaminated soil into groundwater has not been assessed
- The extent of groundwater use for domestic (i.e. potable), irrigation or recreational purposes downgradient of the site remains unknown

4. Environmental setting

4.1 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.

4.2 Site drainage

With the exception of some small garden beds, the site is comprised of sealed surfaces (buildings, concrete hardstand, pavers, etc.). The majority of stormwater is collected in nine stormwater drains along the eastern and southern site boundaries which discharge to the municipal stormwater system on Albert Avenue to the north. Stormwater is subsequently discharged to the Sturt River and Patawalonga River which flow to the Gulf St Vincent (Gov SA 2023).

4.3 Surface water

The nearest natural surface water bodies from the site 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 in a westerly direction and discharges into the Patawalonga River and subsequently into the Gulf St Vincent, 2.6 km to the west of site.

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

4.4 Geology

The PSI report (GHD 2023a) indicated that site surface geology is characterised by Pooraka formation consisting of clay, sand and carbonate earth, silt, with gravel lenses. The soil classification orders were identified to be Rudosol at the site and Chromosol in surrounding areas.

Rudosol soils, on-site and to the northwest, are characterised as coastal dunes and plains of calcareous and siliceous sands. Chromosols, found to the 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.

Further information regarding the encountered lithologies can be found in Section 6.4.1.

4.5 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 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), indicating saline water.

4.6 Local groundwater users (WaterConnect Database)

A search of the SA WaterConnect database (October 2023) 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 480 registered wells within a 2.0 km radius
- Of these registered wells, 61 were listed as backfilled, 45 as operational, 14 as abandoned, nine as decommissioned, seven as dry, five as controlled (4 flowing and 1 shut in), five as rehabilitated, three as unknown, two as not operational, two as not in use and 326 had no listed status
- Of the 45 registered operational wells, 23 were listed for domestic purposes, 10 for aquifer recharge, six for drainage, three for monitoring, two for irrigation, one for industrial, and one for stock
- Of the 326 wells with unknown or no registered status, 109 were listed for investigation purposes, 42 for monitoring, 38 for domestic, 13 for observation, seven for environmental, four for drainage, one for irrigation and 115 had no listed purpose
- TDS data were available for 228 wells within the 2.0 km radius from the site and ranged between 67 mg/L and 22,880 mg/L. The five closest wells (<0.7 km) with TDS data less than 30 years old ranged between 1,154 mg/L and 6,389 mg/L indicating slightly saline to moderately saline water

The results from the SA WaterConnect database search can be found in Appendix D.

5. Assessment criteria

The CoC in this investigation were limited to PFAS. As such, 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.

5.1 Soil

In accordance with the PFAS NEMP (2020), the assessment criteria listed in Table 5.1 have been adopted for the assessment of soil samples.

Table 5.1 Adopted PFAS Assessment Criteria – Soil

Exposure Scenario	PFHxS ¹	PFOS ²	Sum of PFOS and PFHxS	PFOA ³	Principal Reference Document
Human Health Investigation Levels (HIL)					
HIL-B residential with limited soil contact	2 mg/kg	2 mg/kg	2 mg/kg	20 mg/kg	PFAS NEMP (HEPA 2020)
Site-specific HILs ⁴ for the screening of PFAS contaminated soils at MFS sites (Metropolitan, Staffed)	-	-	14 mg/kg	50 mg/kg	Derivation of site-specific health investigation levels for urban and regional fire stations (GHD, June 2023)
Ecological Screening Levels					
Ecological indirect exposure	-	0.14 mg/kg	-	-	PFAS NEMP (HEPA 2020)
Ecological direct exposure	-	1 mg/kg	-	10 mg/kg	

Notes:

¹ PFHxS – perfluorohexane sulfonate

² PFOS – perfluorooctane sulfonate

³ PFOA – perfluorooctanoic acid

⁴ Discussed further in section 5.1.1

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

- The PSIs undertaken at MFS sites across South Australia 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 of this, there may be greater opportunities for direct access to soil at MFS fire stations, including the ingestion of soil and soil-derived dust
- The shifts worked by MFS firefighters do not align with the assumption of a standard working week than 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 MFS fire stations, to allow for tailored assessment of the potential exposure 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 Section 5.1.1.

GHD has made reference to HIL B criteria presented within the PFAS NEMP (2020) to enable assessment of contamination exposure risks with respect to its current land use.

GHD has made reference to both the ecological direct exposure and indirect exposure scenario criteria within the PFAS NEMP (2020) to assess potential ecological exposure risks. These generic criteria apply to all land use scenarios. Further discussion regarding these criteria are provided in Section 5.1.2.

The PFAS NEMP (Section 8, 2020) provides nationally agreed guideline values that are to be used to inform site investigations. The guidelines have been derived based on existing nationally agreed long standing Australian processes.

5.1.1 Site specific human health soil guideline values

GHD letter report *Derivation of site-specific Health Investigation Levels (HILs) for urban and regional fire stations* (GHD, July 2023) outlines SSHILs for the two types of MFS fire stations:

- Urban/metropolitan (also referred to as “staffed”)
- Regional (also referred to as “retained”)

The methodology and associated exposure assessment processes are outlined in Appendix E. The SSHILs will be used in place of the generic HIL D (commercial/industrial) guidelines from the PFAS NEMP 2.0 for the purpose of preliminary screening of potential human health exposure risks for MFS sites.

Additionally, GHD understands that MFS, in consultation with the United Fire Fighters Union of South Australia, have agreed to also adopt a more stringent health investigation level of HIL B (residential with limited soil access) as a “trigger” for further engagement. This has been included at the direction of MFS and is for comparison purposes only.

There are no criteria specific to the assessment of concrete and bitumen regarding potential human health or ecological risk. Sampling of these media has been conducted to assess their potential to act as an ongoing source of PFAS impact to the environment via leaching.

5.1.2 Ecological soil guideline values

The PFAS NEMP provides the following guidance regarding ecological risk for soils:

- “For intensively developed sites with no secondary consumers and minimal potential for indirect ecological exposure, a higher criterion of up to 0.14 mg/kg may be appropriate
- “The indirect exposure value may be over-protective if the area of exposed soil is too small to have any material impact on food chain transfer to secondary consumers such as invertivores and carnivores. In this situation, considering site-specific characteristics may justify the use of a higher value (up to 0.14 mg/kg) as the trigger for a detailed site-specific investigation of risk”

The PFAS NEMP does not provide a rationale for the selection of the 0.14 mg/kg, however GHD notes that this value was sourced from the same document as the other ecological criteria, namely Environment and Climate Change Canada (ECCC 2018) *Federal Environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS)*. This document provides 0.14 mg/kg as the soil guidelines for PFOS in two circumstances:

- Soil Quality Guideline to Protect Freshwater Life under all land uses
- Soil Quality Guideline for Off-site migration under commercial/industrial land uses

The soil quality guideline to protect freshwater aquatic life is the concentration in soil that is expected to protect against potential impacts on freshwater aquatic life from PFOS originating in soil that may enter the groundwater and subsequently discharge to a surface water body. The calculation of this value was made on the basis of the Canadian aquatic screening criteria for PFOS in surface water (6.8 ug/L) and a reverse fate and transport modelling process that assumes a minimum of 10 m lateral separation between the source and the surface water body and incorporates default parameters describing partitioning from soil to leachate, leaching to groundwater, mixing with groundwater and plume migration.

The soil quality guideline for off-site migration under commercial/industrial land uses considers the potential that wind and water erosion of soil can move PFOS contaminated soil from one site to another. The endpoint used to calculate this guideline is the soil quality guideline protective of ecological receptors in residential and agricultural land use settings (0.01 mg/kg - the ecological indirect criteria). A model was then used to predict the movement of soil, including the Universal Soil Loss Equation and the Wind Erosion Equation. Canadian Council of Ministers of the Environment (CCME) (2017) specifically states that this approach is imprecise and that the derived values should be used as a check mechanism only, with professional judgement used to assess whether this is likely to be a migration pathway of concern for an individual site. Given the predominantly commercial land use surrounding the site, it is unlikely that any soil migrating from the site via erosion would be deposited in an area of significant ecological value.

Although the CCME (2017) guidelines have been superseded, the more recent guidelines (Specific Criteria Document for the Development of the Canadian Soil and Groundwater Quality Guidelines for the Protection of Environmental and Human Health - Perfluorooctane Sulfonate) use a similar approach and derive similar values. The reference to the CCME (2017) for this document is to maintain consistency with the PFAS NEMP 2.0 and the original reference material within that document.

It should be noted as outlined in the scope that paver/concrete samples were collected and tested for PFAS compounds, however as no specific criteria exist for other matrices, as such the soil criteria has been used for comparison purposes.

5.2 Groundwater

5.2.1 Environmental and Human Health Guideline Values for Groundwater

The South Australian Environment Protection (Water Quality) Policy 2015 (and amendments) (SA EPA, 2015) (EPP) details the regulatory requirements for the protection of all water bodies (surface and groundwaters) under the Environmental Protection Act 1993. The Policy outlines the applicable environmental values (EVs) for a range of waters, including public stormwater and irrigation drains as well as providing definitions of harm, types of pollutants and the provisions that a person must comply with in taking all reasonable and practicable measures to prevent or minimise harm. Table 5.2 outlines the EVs for various waters as described in Schedule 1 of the EPP:

Table 5.2 Environmental values of particular waters (Extract from Schedule 1, Table 3 WQEPP)

Waters	Aquatic ecosystems	Recreation and aesthetics	Drinking water for human consumption	Irrigation and general use	Livestock watering	Aquaculture and aquatic food production
Marine waters	X					X
Surface waters	X		X	X	X	X
Surface waters (Protection areas ¹)	X	X	X	X	X	X
Public stormwater systems	X	X				
Groundwaters						
TDS < 1200 mg/L			X	X	X	X
TDS between 1200 and 3000 mg/L				X	X	X
TDS between 3000 and 13,000 mg/L					X	X

Note: ¹ Water protection area means a part of the State for the time being declared by proclamation to be a water protection area (EPA 1993).

While not identified specifically in the EPP, contaminated site assessment typically takes into account the potential for abstraction of groundwater for recreational use and migration to aquatic ecosystems so these EV's are included in the assessment process.

To assess the contamination status of groundwater at a site, the GAR (SA EPA 2019a) provides a four-step process to determine the environmental values of groundwater and if actual or potential harm to groundwater that is not trivial has occurred. The four-step process provided in the GAR is described in Table 5.3.

Table 5.3 Four-Step Process for Determining Environmental Values of Groundwater

Process	Assessment
Step 1: Apply Table 3 of Schedule 1 of the 2015 Water Quality Environment Protection Policy (WQEPP, Gov SA 2015) based on TDS ranges. Groundwater well data were filtered so only recent data (<30 years old) from within the same aquifer was used.	The SA WaterConnect database listed 480 registered bores located within a 2.0 km radius of the site. The five closest wells (<0.7 km) with TDS data less than 30 years old ranged between 1,154 mg/L and 6,389 mg/L indicating slightly saline water (1,000 mg/L - 3,000 mg/L) to moderately saline water (3,000 mg/L - 10,000 mg/L).
Step 2: Assess and identify surface water bodies within a 2.0 km buffer of the site.	The nearest surface water bodies are the Sturt River, 1.2 km northwest, and the wetlands associated with the Glenelg Golf Club approximately 0.7 km northwest. The watercourse shown in the Lotsearch report approximately 0.3 km to the south-west of the site (GHD 2023) was identified as a former open stormwater drain that has been backfilled and replaced with underground stormwater pipes.
Step 3: Review registered groundwater users in the WaterConnect database.	A review of the WaterConnect database provided in the Lotsearch report (GHD 2023) identified a total of 480 registered bores within a 2.0 km radius of the site. The identified uses of the bores with operational or unknown status were domestic (23), monitoring/drainage (9), aquifer recharge (10), irrigation (2), industrial (1) and stock (1).
Step 4: Application of the SA EPA recognised criteria for the most sensitive environmental value.	The most sensitive environmental values to be applied to the site are PFAS NEMP 2020 Drinking Water for human health. The most sensitive environmental value for ecological receptors is the 99% freshwater ecological guidelines.

While groundwater TDS indicates there is 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 has 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 the purpose of this investigation, 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

In accordance with the PFAS NEMP (2020), the assessment criteria listed in Table 5.4 have been adopted for the assessment of groundwater samples.

Table 5.4 *Adopted PFAS Interim Screening Criteria for Groundwater*

Exposure Scenario	PFOS ¹	PFHxS ²	Sum of PFOS and PFHxS	PFOA ³	Source
Health Drinking Water ⁵	0.07 µg/L	0.07 µg/L	0.07 µg/L	0.56 µg/L	PFAS NEMP (HEPA 2020)
Fresh waters 95% Species Protection – Slightly to moderately modified ecosystems	0.13 µg/L	-	-	220 µg/L	
Fresh waters 99% Species Protection – High conservation value ecosystems	0.00023 µg/L	-	-	19 µg/L	
Recreational Waters (swimming pools) ⁵	0.7 µg/L	0.7 µg/L	0.7 µg/L	5.6 µg/L	NHMRC 2008 ⁵ ADWG (NHMRC 2011) ⁴

Notes:

¹ PFOS – perfluorooctane sulfonate

² PFHxS – perfluorohexane sulfonate

³ PFOA – perfluorooctanoic acid⁴

⁴ Australian Drinking Water Guidelines 6, Version 3.7, updated January 2022

⁵ The NHMRC 2008 Guidelines for Managing Risks in Recreational Water recommend health guideline values for recreational water that correspond to 10 times the current drinking water guideline value. These guideline values apply in a domestic setting where groundwater is used for recreational purposes such as the filling of swimming pools.

6. Soil investigation

6.1 Soil sample locations and rationale

The soil investigation works described in this section were conducted between 16 - 17 October 2023 under the supervision of an experienced GHD environmental professional. A total of eight bores (BH01 to BH08) were drilled as part of the soil investigation, with a further three being drilled for the installation of groundwater monitoring wells (MW01 to MW03). The investigation locations are shown on Figure 2 at the end of the report. A summary of the rationale behind each location is provided in Table 6.1 below.

Table 6.1 Soil Bore Location Rationale

Soil sampling location	Location Rationale
BH01	Adjacent the rear entrance/exit gate within the firefighting equipment and appliance washdown/. flushing footprint (north).
BH02	Immediately adjacent to the fire-fighting appliance washdown/flushing area (northwest).
BH03	Central western side of the firefighting equipment and appliance washdown/flushing footprint.
BH04	Within the washdown area footprint (south).
BH05	Southeastern portion of site and south of the fire-fighting appliance washdown/flushing area and adjacent stormwater drainage pits.
BH06	Central southern portion of the site and adjacent stormwater drainage pits.
BH07	Within the former AFFF concentrate storage area.
BH08	Southwestern portion of the site and south of the former AFFF concentrate storage area.
MW01	On-site, east of the fire station building within the footprint of the equipment and appliance washdown/flushing area.
MW02	On-site, south of the fire station building and within the former AFFF concentrate storage area.
MW03	On-site, down-hydraulic gradient, northwest of fire station building.

GHD notes the number of soil sampling locations was in accordance with the New South Wales (NSW) Sampling Design Guidelines requirement for the minimum number of sampling locations for a targeted sampling design at a site with an area of 2,771 m².

6.2 Methodology

The methodologies detailed below are in accordance with the following guidelines:

- NEPM 2013, National Environment Protection (Assessment of Site Contamination) Measure, Australian Government, amended 11 April 2013. www.nepc.gov.au/nepms/assessment-site-contamination
- ANZG 2018, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, online resource www.waterquality.gov.au/anz-guidelines, Australian and New Zealand Governments, updated 26 July 2021, (AWQG)
- Gov SA 2015, Environment Protection (Water Quality) Policy 2015 (WQEPP), Version 1.7.2020, Government of South Australia, updated 2020
- NHMRC 2008, Guidelines for Managing Risks in Recreational Water, National Health and Medical Research Council and Natural Resources Management Ministerial Council, Commonwealth of Australia, updated with the recent changes in the ADWG – V3.8 – September 2022
- SA EPA 2019a, Guidelines for the Assessment and Remediation (GAR) of Site Contamination, Environment Protection Authority, South Australia, November 2019
- SA EPA 2019b, Guidelines for Regulatory Monitoring and Testing – Groundwater Sampling, Environment Protection Authority, South Australia, 2019

- NSW EPA 2022, Sampling Design Guidelines for Contaminated Land, Environment Protection Authority, New South Wales, August 2022

The soil investigation methodology was as follows:

- Prior to any intrusive works being undertaken a review of Before You Dig Australia (BYDA) plans was conducted, and all investigation locations were cleared for the presence of underground service by an accredited service locator
- A total of 11 bores (BH01 - BH08 and MW01 - MW03) were drilled as part of the soil investigation. Locations positioned within hardstand areas required concrete/paver cutting prior to drilling
- All soil bores were advanced via drill rig utilising push tube drilling techniques. High density polyethylene (HDPE) core liners were used to retrieve soil cores to minimise the risk of PFAS cross-contamination
- Soils recovered from each soil bore were logged by an experienced GHD environmental professional, and representative soil samples were collected at regular depth intervals and/at each new soil horizon for potential laboratory analyses
- A fresh pair of disposable gloves were worn by the sampler when collecting each individual sample and soil samples were placed in laboratory-supplied sampling jars suitable for PFAS analysis. Soil samples from soil bores were collected immediately following drilling. In general soil samples were taken at near surface (0.1 m bgl), at 0.5 m bgl and every 0.5 m thereafter
- Quality assurance and quality control (QA/QC) samples including intra-laboratory duplicate samples, inter-laboratory duplicate (split) samples, and rinsate blanks were collected as part of the soil sampling program
- Logging of the soil bores was undertaken by an environmental scientist to assess the underlying geology and contaminant indicators in accordance with AS 1726:2017
- Soil samples were stored in an ice filled cool box and transported to a National Association of Testing Authorities (NATA) accredited laboratory under chain of custody documentation

In addition to the soil sampling program 10 concrete paver samples were taken from locations which required concrete coring. These samples were broken into small fragments and placed into laboratory supplied sampling containers. The samples were then managed in accordance with the above methodology.

6.3 Soil analytical program

The analytical laboratories used for the soil investigation were ALS Laboratory Group (ALS) (primary laboratory) and Eurofins (secondary laboratory). Both laboratories are registered by the National Association of Testing Authorities (NATA) and the analyses conducted were within their NATA registration.

In general, two to three samples from each borehole were analysed, with each sample analysed for PFAS compounds.

6.4 Soil sampling results

6.4.1 Subsurface Conditions

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

- Fill material was encountered at all locations, generally comprising of an upper layer of fine to medium, poorly graded gravelly sand with angular to subangular gravel, ranging in colour from pale grey to orange-brown to dark grey-brown in appearance and slightly moist
- All soil bores, with the exception of MW03, noted an additional layer of fill material consisting of fine to medium, poorly graded sand, ranging in colour from pale yellow to orange-brown to dark-brown with black. MW03 consisted of dark brown silty sand with trace rootlets above the gravelly sand fill material
- Brick fragments were noted at BH05 and MW03
- A natural soil layer reported as moist to very moist, fine to medium, poorly graded sand was encountered at all locations with the exception of BH01, with colour ranging from pale tan-brown to dark grey to black-brown

- MW03 encountered a low plasticity, fine to medium, dark-brown sandy clay layer above the moist sand. Groundwater was encountered within this sand layer
- A low to medium plasticity, orange-brown, fine to medium, poorly graded sandy clay was then encountered in all bore holes. Pale grey mottling was noted in most boreholes
- The target depth was achieved in boreholes MW01 - MW03 and BH01 - BH03. The remaining boreholes collapsed due to saturated soil between 3 - 4 m bgl and were subsequently terminated

A summary of materials encountered at the site is provided in Table 6.2. Detailed borelogs can be found in Appendix F.

Table 6.2 Summary of Lithologies Encountered

Lithology	Depths observed (m bgl)	Description
Fill	0.0 – 0.5	Gravelly SAND: fine to medium, poorly graded, subangular, pale-grey to brown-grey, fine to medium, poorly graded gravel
	0.5 – 0.7	SAND: fine to medium, poorly graded, pale-yellow to orange-brown to brown-grey to dark-brown
Natural soils	0.7 – 1.5	SAND: fine to medium, poorly graded, white-tan to brown-grey to black-brown
	1.5 – 5.0	Sandy CLAY: low to medium plasticity, orange-brown mottled pale grey, fine to medium, poorly graded sand

6.4.2 Analytical results

The exceedances of the adopted assessment criteria protective of human health and the environment are presented in Table 6.3. A figure showing exceedances with respect to each borehole location is presented in Figure 3 at the end of the report. PFAS concentrations in all remaining soil samples, including selected concrete samples were reported to be below the laboratory reporting limits or below the adopted assessment criteria.

The laboratory certificates for the soil analytical results, along with chain of custody and sample receipt notifications are provided in Appendix G. A full set of tabulated analytical results can be found in Appendix H.

Table 6.3 Results Above Adopted PFAS Assessment Criteria

Location	Depth (m bgl)	PFHxS (mg/kg)	PFOS (mg/kg)	PFOA (mg/kg)	Sum of PFHxS and PFOS (mg/kg)
BH05	0.4 – 0.5	0.0015	0.228	0.0002	0.230
BH06	0.6 – 0.7	0.0309	0.228	0.0024	0.259

Notes:

Blue denotes an exceedance of the ecological indirect exposure assessment criteria for developed sites

Paver/Concrete Testing Results

Paver/Concrete analytical results were compared to the soil human health and ecological guideline values as a conservative assessment in the absence of paver-specific guideline values. No results exceeded the adopted on-site PFAS assessment criteria protective of human health and the environment. However, minor concentration of PFAS compounds were detected. These results are provided along with the soil data in Appendix H. Considering results are below the adopted criteria under such circumstances, it can safely be concluded that pavers on-site do not constitute a significant risk as a PFAS source.

7. Groundwater investigation

7.1 Groundwater well locations and rationale

Three groundwater wells (MW01 - MW03) were installed at the site on 17 October 2023 to target the following site features:

- Two down hydraulic gradient wells located in the east and south of the site near the stormwater pits (MW01 and MW02) to enable the calculation of the local groundwater flow direction and to determine the potential presence of on-site PFAS
- One well located down hydraulic gradient in the northwest corner of the site (MW03) to enable the calculation of the local groundwater flow direction and to determine if PFAS impacts in groundwater are migrating off-site

The location of the monitoring wells is shown on Figure 2 at the end of the report.

7.2 Well Installation methodology

All groundwater monitoring wells were drilled and installed by WB Drilling Pty Ltd under the supervision of an experienced GHD environmental professional. The drilling method used included concrete coring through the concrete followed by push-tube and solid flight auger to the base of the boreholes. Well permits were obtained from the Government of South Australia's Department of Environment and Water. Copies of well permits are provided in Appendix I. The well construction methodology is outlined below:

- Two monitoring wells were drilled to a depth of approximately 3.5 m bgl and one monitoring well was drilled to a depth of approximately 4 m bgl. The water strike was determined through various observations including appearance of water and changes in soil moisture content
- Groundwater was intercepted in BH04 – BH08 and MW01 – MW03 between the depths of 0.8 – 1.5 m bgl
- 3 m slotted PVC screens were installed from the base of the boreholes with solid PVC casing to the surface. This length was considered adequate to account for seasonal groundwater level variations
- A gravel pack was installed around the screen, extending from the base to 0.5 m bgl
- A bentonite plug was 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, approximately flush to the surrounding ground surface
- Following installation, the groundwater wells were developed to remove excess silt/entrained sediments and to ensure representative groundwater was flowing into the well. The wells were developed using a decontaminated steel bailer. The bailer was decontaminated between well locations using a phosphate-free detergent and subsequently rinsed with tap water, followed by de-ionised water
- Groundwater wells were surveyed by licensed surveyor Linkup Construction Surveys Pty Ltd. The survey results are included in Appendix J

Groundwater well construction logs are presented in Appendix F. Table 7.1 below presents a summary of the construction details along with survey detail (elevation) of the wells.

Table 7.1 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		
MW01	449012	17/10/2023	3.5	0.5 - 3.5	275193.215	6127911.153	6.061	5.994
MW02	449011	17/10/2023	4.0	1.0 - 4.0	275168.541	6127894.268	6.122	6.003
MW03	449013	17/10/2023	3.5	0.5 - 3.5	275148.528	6127933.116	6.534	6.411

7.3 Groundwater sampling methodology

Groundwater samples were collected in accordance with GHD's standard operating procedures for groundwater sampling and in accordance with SA EPA guidelines for regulatory monitoring and testing – Groundwater sampling (SA EPA 2019b).

All groundwater wells were left for a minimum of seven days following well development to allow for the stabilisation of aquifer conditions. Groundwater sampling was conducted on the 24 October 2023.

All groundwater wells were gauged prior to sampling. The standing water levels were measured from the top of the well casing (TOC) using an interface probe.

All monitoring wells were purged and sampled using a low flow sampling technique (peristaltic pump). During purging, field groundwater quality parameters were collected including pH, redox potential, dissolved oxygen, electrical conductivity, and temperature to ensure stable conditions prior to sample collection.

Groundwater samples were collected in appropriate containers suitable for PFAS analysis whilst using clean nitrile gloves between sample locations to prevent cross-contamination. The samples were subsequently stored in an esky and were delivered under chilled conditions to the analytical laboratory with accompanying chain of custody documentation.

The groundwater gauging and sampling records are provided in Appendix K.

7.4 Groundwater analytical program

The laboratories used for the groundwater investigation were ALS Laboratory Group (ALS) (primary laboratory) and Eurofins (secondary laboratory). Both laboratories are registered by the National Association of Testing Authorities (NATA) and the analyses conducted were within their NATA registration.

All groundwater samples were subject to PFAS long-suite analyses with a standard limit of reporting (LOR). QA/QC samples (field blanks, rinsate blanks and duplicate pairs) were also analysed as part of quality control protocol.

7.5 Groundwater investigation results

7.5.1 Subsurface conditions

Subsurface conditions encountered whilst drilling the groundwater monitoring wells were as follows:

- Gravelly sand to sand fill material was predominantly encountered below the concrete in MW01 and MW02 (0.2 – 0.5 m bgl)
- Silty to gravelly sand fill material was encountered to a depth of 1.1 m bgl in MW03
- Natural sand material was encountered to a depth of approximately 1.5 m bgl. Water strike was noted on the borelogs within this material
- Sandy clay material was then encountered to termination depth
- No evidence of staining or the presence of any distinguishable olfactory odours were noted during sampling

Groundwater well drilling logs are presented in Appendix F.

7.5.2 Groundwater levels and inferred groundwater flow

Groundwater levels in the wells were gauged from the marked point on the well casing on the 24 October 2023 using an electronic interface water level meter during the groundwater monitoring event. The groundwater gauging sheets are attached in Appendix K. Groundwater levels are presented in Table 7.2.

Table 7.2 Relative Groundwater Levels (AHD)

Well ID	Surveyed TOC (m AHD)	Surveyed Ground Level (m AHD)	Depth to Groundwater (m bTOC)	Relative Groundwater Level (m AHD)
MW01	5.994	6.061	1.093	4.901
MW02	6.003	6.122	1.139	4.864
MW03	6.411	6.534	1.714	4.697

The groundwater gauging results were used to interpret a groundwater contour map presented as Figure 4 at the end of the report. Groundwater was inferred to flow in a north-westerly direction, which is consistent with the expected regional groundwater flow.

7.5.3 Field measured water quality parameters

No contamination indicators (such as hydrocarbon presence, 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 prior to sampling are summarised in Table 7.3.

Table 7.3 Field Measured Groundwater Quality Parameters

Well ID	Date Sampled	Temp (°C)	pH	Dissolved oxygen (mg/L)	Oxidation-reduction potential (mV)	Electrical conductivity (µS/cm)	TDS (mg/L)
MW01	24/10/2023	19.3	7.29	1.26	-132.4	7,918	5,068
MW02	24/10/2023	19.9	7.02	1.62	-140.5	12,810	8,198
MW03	24/10/2023	18.9	7.04	1.57	-159.4	11,862	7,592

Notes: Conversion factor from EC (µS/cm) to TDS (mg/L) is 0.64

The above field parameters are indicative of the following:

- The shallow groundwater encountered at the site is generally neutral with pH ranging between 7.02 and 7.29
- The groundwater is considered to be brackish with electrical conductivity values ranging between 7,918 and 12,810 µS/cm

7.5.4 Analytical results

A summary of exceedances to the adopted groundwater criteria is tabulated in Table 7.4. The laboratory certificates of analysis are contained in Appendix G. A figure showing exceedances with respect to each borehole location is presented in Figure 5 at the end of the report. Detailed analytical groundwater results are provided in Appendix H.

Table 7.4 Summary of Groundwater Exceedances Against Adopted Criteria

Location	Date	PFHxS (µg/L)	PFOS (µg/L)	PFOA (µg/L)	Sum of PFHxS and PFOS (µg/L)
MW01	24/10/2023	0.08	0.06	<0.01	0.14
MW02	24/10/2023	0.05	0.04	<0.01	0.09
MW03	24/10/2023	0.64	0.04	0.02	0.68

Notes:

Blue depicts exceedances of the PFAS NEMP 2.0 Freshwater – 99% Species Protection – Slightly to Moderately Disturbed Systems criteria.

Yellow depicts exceedances of the ADWG Health (v3.7 updated 2022) criteria.

8. Quality Assurance and Quality Control

A detailed Quality Assurance and Control (QA/QC) assessment was completed for all analytical sample data, in order to determine whether it is of suitable quality on which to base the site assessment. This included the collection and review of inter- and intra-laboratory duplicates and rinsate blank samples.

The QA/QC assessment found that the majority GHD QA/QC Data Quality Indicators (DQIs) were within the specified requirements. Some PFAS compounds noted relative percentage differences (RPD) exceedances, however this is likely due to the low concentrations of PFAS compounds detected in the samples. The data is, therefore considered to be valid and of sufficient quality to rely on for the purpose and objectives of this assessment. A copy of the detailed QA/QC report, including calibration certificates are provided in Appendix I.

9. 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 unless there is a complete Source-Pathway-Receptor (SPR) linkage. Conversely, complete SPR linkages do not by default indicate a risk and the site investigation process is used to evaluate the extent of potential risks.

Based on the potential SPR linkages identified in the PSI (GHD 2023a), and additional information gained during this investigation, the CSM developed for the site has been refined and is summarised in Table 9.1.

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 source extent and/or pathways to a receptor are not understood
- Likely – PFAS impact has been confirmed and pathways to receptors are likely present, however extent of the connection has not been confirmed or is not fully understood
- Confirmed – PFAS impact greater than the adopted assessment criteria are shown to be present at the receptor, hence SPR linkage has been confirmed present
- 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 complete

Visual representations of the CSM are shown in Figures 6 and 7 at the end of the report.

Table 9.1 CSM for PFAS exposure - SPR linkage assessment

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 samples taken on-site were below the adopted Tier 1 HIL B for residential minimal accessible soil land use.
		Incidental ingestion of contaminated soil	
		Inhalation of contaminated soil or dust from disturbed soils	
	Ecosystem 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, it is considered unlikely to impact a high value ecosystem. PFAS concentrations detected in sub-surface soil samples which 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 would only consume PFAS through the food chain and bioaccumulation.
		Ingestion of contaminated soil	
		Bioaccumulation through indirect contact	
	Groundwater beneath the site	Rainwater/surface runoff leaching impacted soil followed by migration through porous media into groundwater	Likely PFAS concentrations have been detected in all three of the groundwater monitoring wells installed on site with exceedances above adopted PFAS NEMP Freshwater 99% criteria and human health drinking water criteria.
		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 stable and inert nature of the media. Although this pathway is unlikely, there is still the potential for this to become a completed pathway.
		Inhalation of contaminated dust	

Source	Potential Receptors	Exposure Pathways	Risk from exposure through SPR Linkages
	Surface and storm water	Surface run-off into site stormwater system	Likely Concrete and bitumen media is known to leach PFAS compounds into surface water which it comes into contact with. Given the washdown/flushing area slopes south into the site stormwater system, and that PFAS concentrations were detected in concrete and paver samples, it is considered possible that PFAS impacted rainwater/surface water could enter the stormwater system and discharge to surface water bodies.
	Groundwater beneath the site	Direct contact with contaminated groundwater	Likely 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. PFAS concentrations have been detected in all three of the 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.
		Ingestion of contaminated groundwater	
		Bioaccumulation through indirect contact	
Off-site PFAS impacted soils.	Off-site maintenance and subsurface construction workers	Direct dermal contact with contaminated soil	Unlikely Although no off-site soil samples have been sampled, PFAS concentrations detected to date in on-site soils and concrete/pavers were below the adopted human health investigation levels. It is considered unlikely that off-site visitors, maintenance, or construction workers would be exposed to PFAS quantities detrimental to their health.
		Incidental ingestion of contaminated soil	
		Inhalation of contaminated soil or dust from disturbed soils	
	Off-site public open space	Direct dermal contact or ingestion of contaminated soils	Unlikely PFAS concentrations detected to date in on-site soils sampled along the northern and western boundaries were below the adopted Tier 1 HIL B for residential minimal soil accessible land use, which is more conservative than the HIL C public open space guideline values.
	Ecosystem surrounding the site	Direct contact with contaminated soil	Unlikely PFAS concentrations detected in soil on-site has exceeded the adopted Tier 1 interim ecological criteria for indirect exposure, however these concentrations are isolated to the central and southeastern boundary of the site, and not in boreholes sampled to the west and north of the washdown/flushing area. Contaminated soil is therefore unlikely to extend beyond the site boundaries.
		Ingestion of contaminated soil	
		Bioaccumulation through indirect contact	

Source	Potential Receptors	Exposure Pathways	Risk from exposure through SPR Linkages
	Groundwater beneath impacted soil	Rainwater/surface runoff leaching impacted soil followed by migration through porous media into groundwater	Possible Concrete and bitumen surfaces on-site that have historically been exposed to PFAS containing AFFF during training and flushing activities have been sampled and confirmed the presence of PFAS compounds. PFAS concentrations have been detected in all three of the 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. These impacts have the potential to have migrated off-site.
PFAS impacted groundwater	People using groundwater for: domestic and drinking purposes	Consumption of contaminated groundwater	Possible PFAS concentrations have been detected in on-site monitoring wells above the Human Health drinking water criteria. PFAS concentrations in groundwater down hydraulic gradient of the site have not been delineated. Within a 2.0 km radius of the site, 16 registered wells had TDS values in groundwater below 1,200 mg/L, which is considered suitable for domestic and primary irrigation purposes (Gov SA 2015). As some of the wells had an unlisted purpose, potable use of groundwater cannot be ruled out at this stage. However, the region of the site has reticulated water supply so it is considered unlikely that groundwater would be utilised for consumption.
	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	Possible Eight registered wells within a 2.0 km radius of the site had irrigation purposes. The extent of PFAS in groundwater down hydraulic gradient of the site has not been assessed and residential properties with gardens where edible vegetation could be grown are present within 2.0 km of the site.
	People growing edible vegetation in open soil which may interact with groundwater	Consumption of PFAS impacted edible vegetation	On-site: No MFS staff have removed all edible vegetation from the MFS sites. Off-site: Possible The inferred groundwater flow direction is to the north-west. The presence of PFAS contamination in this direction has not been delineated and residential properties with gardens where edible vegetation could be grown are present within 2.0 km of the site.
	People using groundwater for recreational purposes such as filling of swimming pools	Incidental ingestion of contaminated groundwater	Possible The extent of PFAS in groundwater down hydraulic gradient of the site has not been delineated and two wells within a 2.0 km radius of the site identified as being for a recreational purpose.

Source	Potential Receptors	Exposure Pathways	Risk from exposure through SPR Linkages
	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	Possible Whilst it is possible that off-site maintenance or sub-surface construction workers could incidentally ingest contaminated groundwater, it is unlikely that they will ingest quantities detrimental to their health. Dermal contact is a possible pathway given the expected shallow depth of groundwater at the site.
	Freshwater ecosystem of Sturt River, Brown Hill Creek/Willawilla and Patawalonga River	Direct contact and/or ingestion with contaminated groundwater	Possible All surface water bodies lie within the 2km radius of the site. Groundwater is reported to be at a minimum, approximately 1.0 - 1.5 m bgl. The extent of PFAS in groundwater down hydraulic gradient of the site has not been delineated, nor has the interaction of surface water with the groundwater beneath it.
		Bioaccumulation through direct contact	
	Recreational users of Sturt River, Brown Hill Creek/Willawilla and Patawalonga River	Direct contact and/or ingestion with contaminated groundwater.	

10. Discussion

10.1 PFAS soil impacts

Results showed PFOS concentrations above the adopted assessment criteria for indirect ecological exposure for developed sites (0.14 mg/kg) in two of the soil samples collected from BH05 and BH06, detailed in Table 6.3. All exceedances for ecological criteria occurred beneath the sealed concrete apron to the south of the washdown/flushing area, near the sites drainage system. The highest concentrations of PFOS were identified between 0.4 - 0.7 m bgl with an exceedance of 0.228 mg/kg (at both BH05 and BH06).

The vertical extent of PFAS detections have not been achieved for boreholes BH01, BH02, BH06 and MW01, however detections in these soil bores continue to decrease with depth to 3 m bgl, as shown in the tabulated laboratory results in Appendix H. The lateral extent of PFAS impacts have been delineated to the north and west for the adopted assessment criteria for current site use (i.e. commercial/industrial). Although soil impacts have not been delineated to the south and in the southeastern corner of the site, it is likely that PFAS impacts are highest in this area due to the location of the site drainage system and are unlikely to extend offsite in these directions.

The following discussion focuses on potential risks to the identified receptors based on the available information and in the context of the project objectives presented in Section 1.2 and the CSM provided in Section 9.

The PFAS NEMP 2.0 (2020) direct and indirect ecological exposure risk values for PFOS and PFOA are protective of organisms that are in direct contact with soil (i.e., plants and worms) and secondary consumers (i.e., birds, small mammals, and reptiles), respectively.

The NEMP (2020) indirect ecological exposure value of 0.01 mg/kg is a default value derived for all land use scenarios, it also states that this guideline value may be overprotective and site-specific characteristics may justify the use of a higher value (0.14 mg/kg). The default value of 0.01 mg/kg is not considered relevant to the site, the site does not provide high quality foraging habitat for higher trophic level organisms (although they may visit) which is discussed in Section 5.

As industrial businesses are located directly to the south and east of the site, it is unlikely that the PFAS containing soils at the site will cause a risk to the ecological environment. Also, due to the extensively sealed surfaces surrounding the site to the north and west, in the form of roads and commercial development, potential soil impacts and/or exposure pathways external to the site are considered negligible.

The PFAS NEMP 2.0 (2020) HIL A and HIL B human health-based investigation levels for soil are used to assess potential human exposure to PFAS contaminated soils in line with the applicable soil accessibility. The HIL A investigation level assumes that soil is accessible, and that edible vegetation is grown, with up to 10% of the edible vegetation making up an individual's diet. The HIL B investigation level assumes no potential use for soil for consumption of home-grown produce, such as dwellings with fully paved yard spaces.

No soil samples or paving/concrete samples exceeded the Tier 1 human health assessment criteria.

10.2 PFAS groundwater impacts

Concentrations above the 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) compared to the adopted criteria of 0.07 µg/L (ADWG).

PFOS concentrations above the PFAS NEMP Freshwater - 95% for slightly to moderately disturbed systems was also reported in all three monitoring wells ranging from 0.04 - 0.06 µg/L. With the exception of PFOS and PFHxS, MW01 and MW02 reported no other PFAS compounds above the LOR. MW03 reported concentrations above the LOR, but below criteria for PFBS, PFPeS, PFHxS, PFOS, PFPeA, PFHxA and PFOA.

In Australia, the advice provided in the National Water Quality Management System and Water Quality Guidelines when assessing bioaccumulative contaminants, including PFAS, is to use a higher degree of species protection than would normally be used. In most cases, this means the 99% species protection level would be used as a screening value for slightly-to-moderately impacted systems, rather than the 95% value. This advice is intended as a practical measure to provide an additional level of protection to account for bioaccumulation (HEPA 2020).

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. As down-gradient well MW03 reported the highest concentration for Sum of PFHxS and PFOS, it is likely that PFAS contamination extends off-site to the north-west, however has not been delineated.

The potential uptake of contaminated, relatively shallow groundwater by trees down-hydraulic gradient of the site can also not be ruled out at this stage.

The PFAS NEMP 2.0 (HEPA, 2020) drinking guidelines were adopted in consideration for managing the quality of drinking water for consumers and to assure safety at the point of use.

Given the number of registered wells within a 2 km radius of the site either with no recorded purpose or being for domestic use, the use of a certain number of these wells for drinking water purposes cannot be discounted. However due to the location of these wells being within an urban area with access to a quality reticulated water supply, the linkage is unlikely.

11. Conclusions and recommendations

Based on the results of this investigation the following conclusions have been made:

- The lithologies that were encountered beneath the site are consistent with the Pooraka Formation with sand and sandy clay identified below the 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 flushing of appliances and equipment in the washdown/flushing 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/flushing 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 as part of this investigation, PFAS concentrations were reported as continuing to decrease below 0.4 - 0.7 m bgl. There were no reported concentrations which were above the criteria below this level
- PFAS results obtained from paver/concrete samples were below the adopted on-site soil PFAS assessment criteria protective of human health and the environment
- Concentrations above the Tier 1 ADWG recommendations for human health drinking water were reported in all monitoring wells for Sum of PFHxS and PFOS (0.07 µg/L), with exceedance values ranging from 0.09 µg/L (MW02) to 0.68 µg/L (MW03), showing an increase in concentration in the direction of the inferred groundwater flow
- PFOS concentrations above the PFAS NEMP Freshwater - 99% for high conservation value systems (0.00023 µg/L) was also reported in all three monitoring wells ranging from 0.04 - 0.06 µg/L
- MW03 is located on the northwest corner of the site, in the inferred direction of groundwater flow, down-gradient from the washdown/flushing area and associated site drainage. As MW03 reported the highest concentration for Sum of PFHxS and PFOS, it is likely that PFAS contamination in groundwater extends off-site to the north-west

The following recommendations have been made:

- GHD recommends further intrusive assessment works to delineate the nature and spatial extent of the groundwater contamination off-site to the north-west including:
 - Installation of 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 within the vicinity of the site to evaluate the potential exposure risk attributable to the possible use of groundwater for wells with an undefined or domestic purpose

12. References

- ANZG 2018, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, online resource www.waterquality.gov.au/anz-guidelines, Australian and New Zealand Governments, updated 26 July 2021, (AWQG).
- Canadian Council of Ministers of the Environment (CCME) 2017, Canadian water quality guidelines for the protection of aquatic life: CCME Water Quality Index, User's Manual – 2017 Update. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.
- ECCC 2018, Federal Environmental Quality Guidelines – Perfluorooctane Sulfonate (PFOS), Environment and Climate Change Canada, May 2018.
- Gerges, N. 2006, Overview of the hydrogeology of the Adelaide metropolitan area, Department of Water, Land and Biodiversity Conservation, South Australia, DWLBC Report 2006/10, June 2006.
- GHD 2019, MFS Statewide Appliance and Station Sampling, Report prepared for the South Australian Metropolitan Fire Service by GHD Pty Ltd, May 2019.
- GHD 2022, MFS 17 Fire Stations, PFAS Risk Profiling, Report prepared for the South Australian Metropolitan Fire Service by GHD Pty Ltd, 26 October 2022.
- GHD (2023a), MFS Camden Park Station Preliminary Site Investigation, Report prepared for the South Australian Metropolitan Fire Service by GHD Pty Ltd, July 2023
- GHD (2023b), MFS Camden Park Station, Sampling and Analysis Quality Plan (SAQP), Report prepared for the South Australian Metropolitan Fire Service by GHD Pty Ltd, September 2023
- GHD 2023c, Derivation of Site-specific Health Investigation Levels for Urban and Regional Fire Stations – South Australian Metropolitan Fire Service (SA MFS), 28 June 2023.
- Gov SA 2015, Environment Protection (Water Quality) Policy 2015 (WQEP), Version 1.7.2020, Government of South Australia, updated 2020
- Gov SA 2023, Location SA Map Viewer, Government of South Australia, via <https://location.sa.gov.au/viewer/>.
- HEPA 2020, PFAS National Environmental Management Plan (Version 2.0), Heads of Environment Protection Authorities Australia and New Zealand, January 2020. (PFAS NEMP).
- NEPC 1999, *National Environmental Protection (Assessment of Site Contamination) Measure* 1999 (ASC NEPM), as amended 2013, National Environment Protection Council.
- NEPM 2013, National Environment Protection (Assessment of Site Contamination) Measure, Australian Government, amended 11 April 2013. www.nepc.gov.au/nepms/assessment-site-contamination
- NHMRC 2008, Guidelines for Managing Risks in Recreational Water, National Health and Medical Research Council and Natural Resources Management Ministerial Council, Commonwealth of Australia, updated with the recent changes in the ADWG – V3.8 – September 2022
- NSW EPA 2022, Sampling Design Guidelines for Contaminated Land, Environment Protection Authority, New South Wales, August 2022
- SA EPA 2019a, Guidelines for the Assessment and Remediation (GAR) of Site Contamination, Environment Protection Authority, South Australia, November 2019.
- SA EPA, 2019b, Guidelines for Regulatory Monitoring and Testing – Groundwater Sampling, Environment Protection Authority, South Australia, 2019.
- SAPPA 2022, South Australian Property and Planning Atlas Government map index, accessed September 2022 via <https://sappa.plan.sa.gov.au/>.
- SARIG 2022, South Australian Resources Information Gateway, accessed September 2022 via <https://map.sarig.sa.gov.au/>.

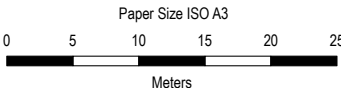
Figures

<i>Figure 1</i>	<i>Site Location Plan</i>
<i>Figure 2</i>	<i>Soil and Groundwater Sampling Locations</i>
<i>Figure 3</i>	<i>Soil Criteria Exceedances</i>
<i>Figure 4</i>	<i>Groundwater Contour Map</i>
<i>Figure 5</i>	<i>Groundwater Criteria Exceedances</i>
<i>Figure 6</i>	<i>Conceptual Site Model</i>
<i>Figure 7</i>	<i>Conceptual Site Model cross section</i>

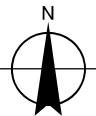


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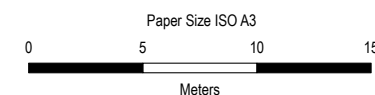
Camden Park Site Location Plan

FIGURE 1

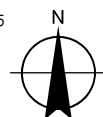


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South Australian Metropolitan Fire Service
Camden Park Detailed Site Investigation

Camden Park Soil and
Groundwater Bore Locations

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Date 12/02/2024

FIGURE 2

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Data source: GHD: Site Boundary (2022); DPTI: Cadastre, Roads (2015); MetroMap: Imagery (Imagery Date: 18/12/2022;
Date Extracted: 01/03/2023). Created by: ejuan

Exposure Scenario	PFHxS ¹	PFOS ²	Sum of PFOS and PFHxS	PFOA
HIL-B residential with limited soil contact	2 mg/kg	2 mg/kg	2 mg/kg	20 mg/kg
Site-specific HILs for the screening of PFAS contaminated soils at SA MFS sites (Metropolitan, Staffed)	-	-	14 mg/kg	50 mg/kg
Ecological indirect exposure (Developed sites)	-	0.14 mg/kg	-	-
Ecological direct exposure	-	1 mg/kg	-	10 mg/kg

Legend	
	Groundwater Monitoring Wells
	Soil Boreholes
	Stormwater Pits
	Roads
	AFFF Storage Pod
	Appliance flushing area / rear yard
	Site Boundary
	Cadastre

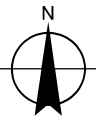
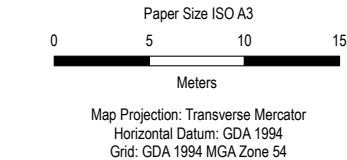


BH06				
Depth (mbgl)	PFHxS (mg/kg)	PFOS (mg/kg)	PFOA (mg/kg)	Sum of PFHxS and PFOS (mg/kg)
0.6 - 0.7	0.0309	0.228	0.0024	0.259

BH05				
Depth (mbgl)	PFHxS (mg/kg)	PFOS (mg/kg)	PFOA (mg/kg)	Sum of PFHxS and PFOS (mg/kg)
0.4 - 0.5	0.0015	0.228	0.0002	0.230

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Camden Park Soil
Results Exceedances

FIGURE 3



Legend

- Groundwater Monitoring Wells
- Soil Boreholes
- Stormwater Pits
- Inferred Groundwater Direction
- Inferred Groundwater Contour (mAHD)
- Roads
- AFFF Storage Pod
- Appliance flushing area / rear yard
- Site Boundary
- Cadastre

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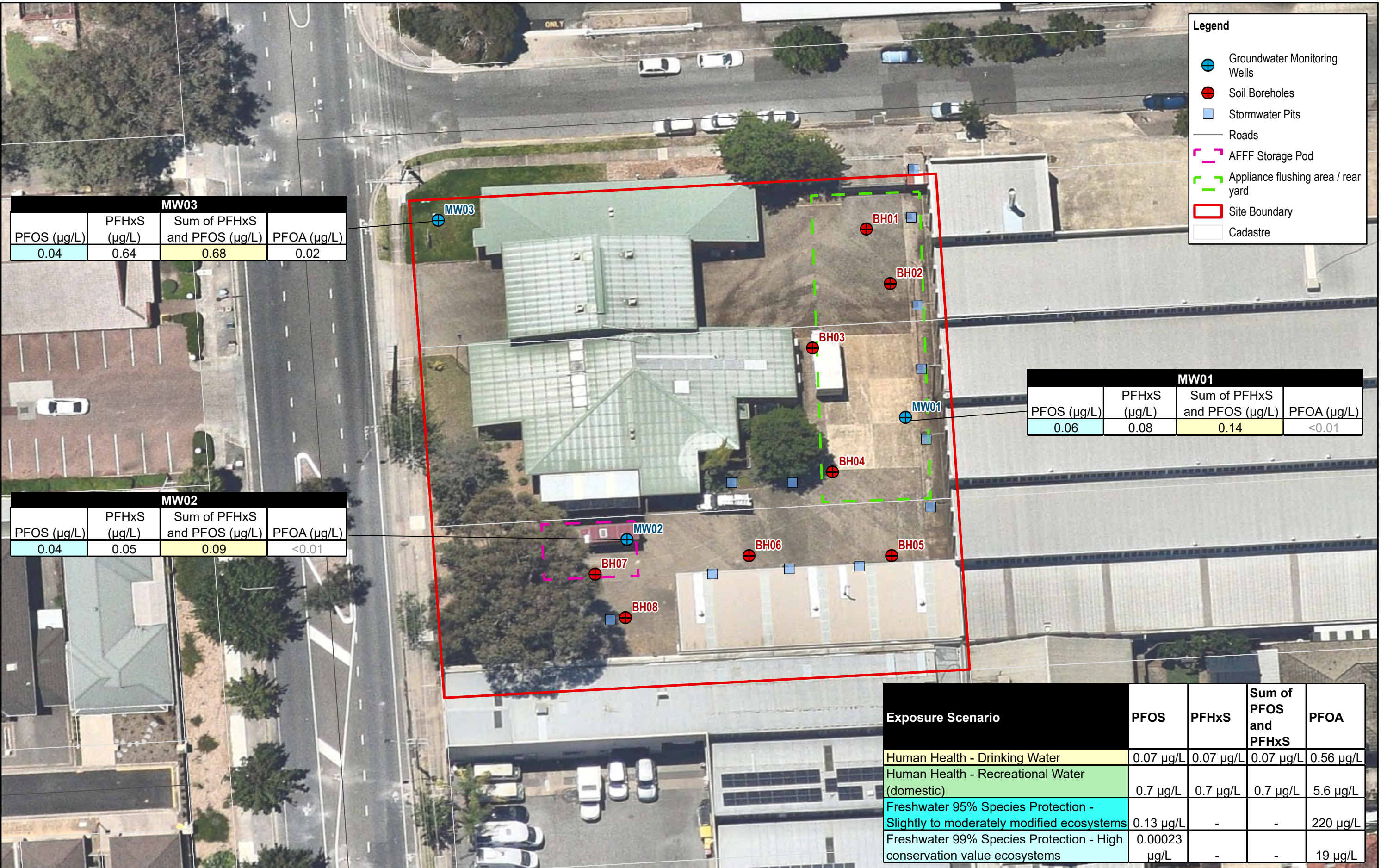
South Australian Metropolitan Fire Service
Camden Park Detailed Site Investigation

Camden Park Groundwater Contour Map

Project No. 12616802
Revision No. B
Date 12/02/2024

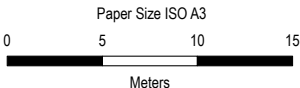
FIGURE 4

Data source: GHD: Site Boundary (2022); DPTI: Cadastre, Roads (2015); MetroMap: Imagery (Imagery Date: 18/12/2022; Date Extracted: 01/03/2023). Created by: ejuan

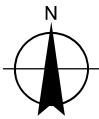


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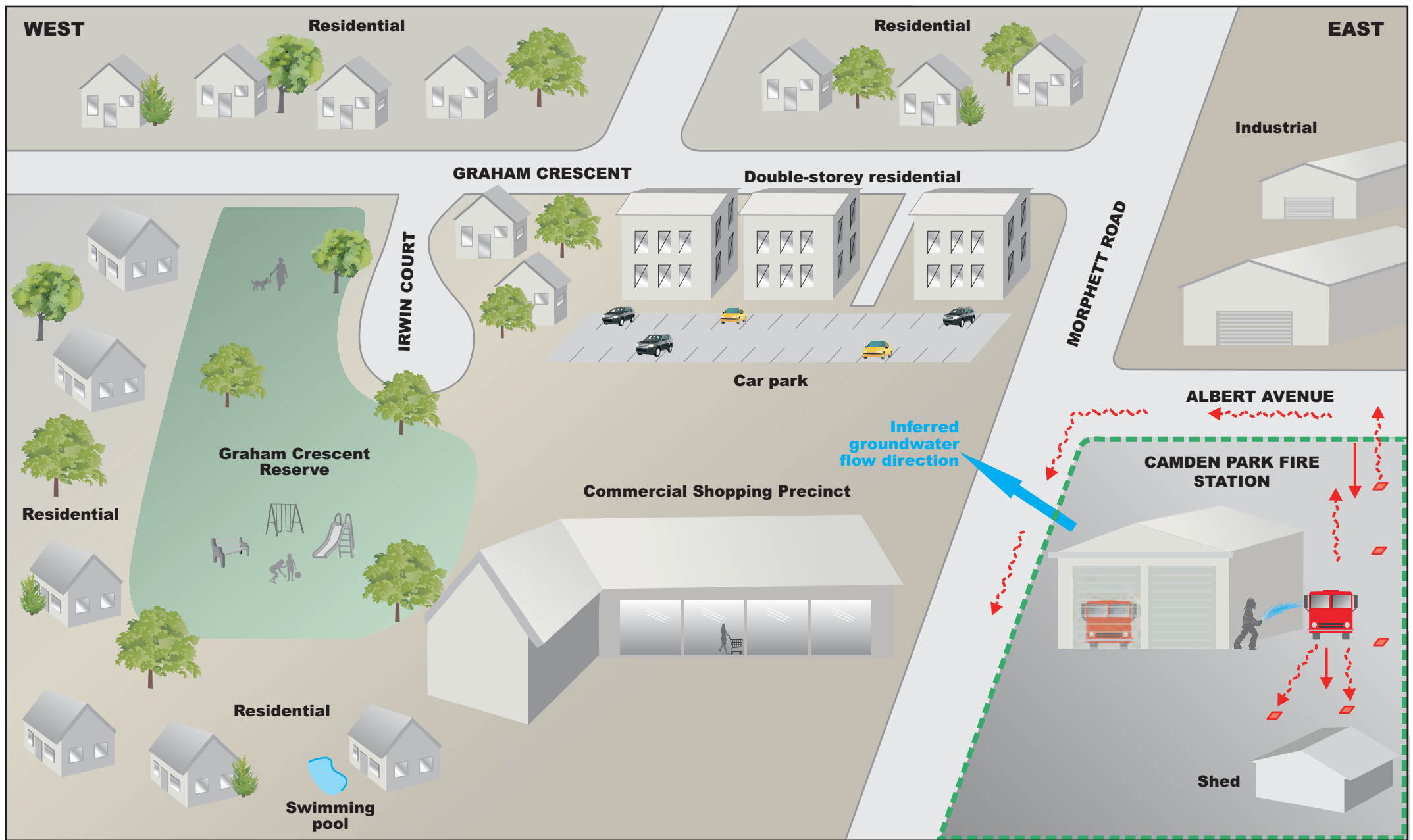


South Australian Metropolitan Fire Service
Camden Park Detailed Site Investigation

Camden Park Groundwater
Results Exceedances

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Date 12/02/2024

FIGURE 5



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 DSI
65 Morphet Road, Camden Park, SA 5038

Conceptual site model

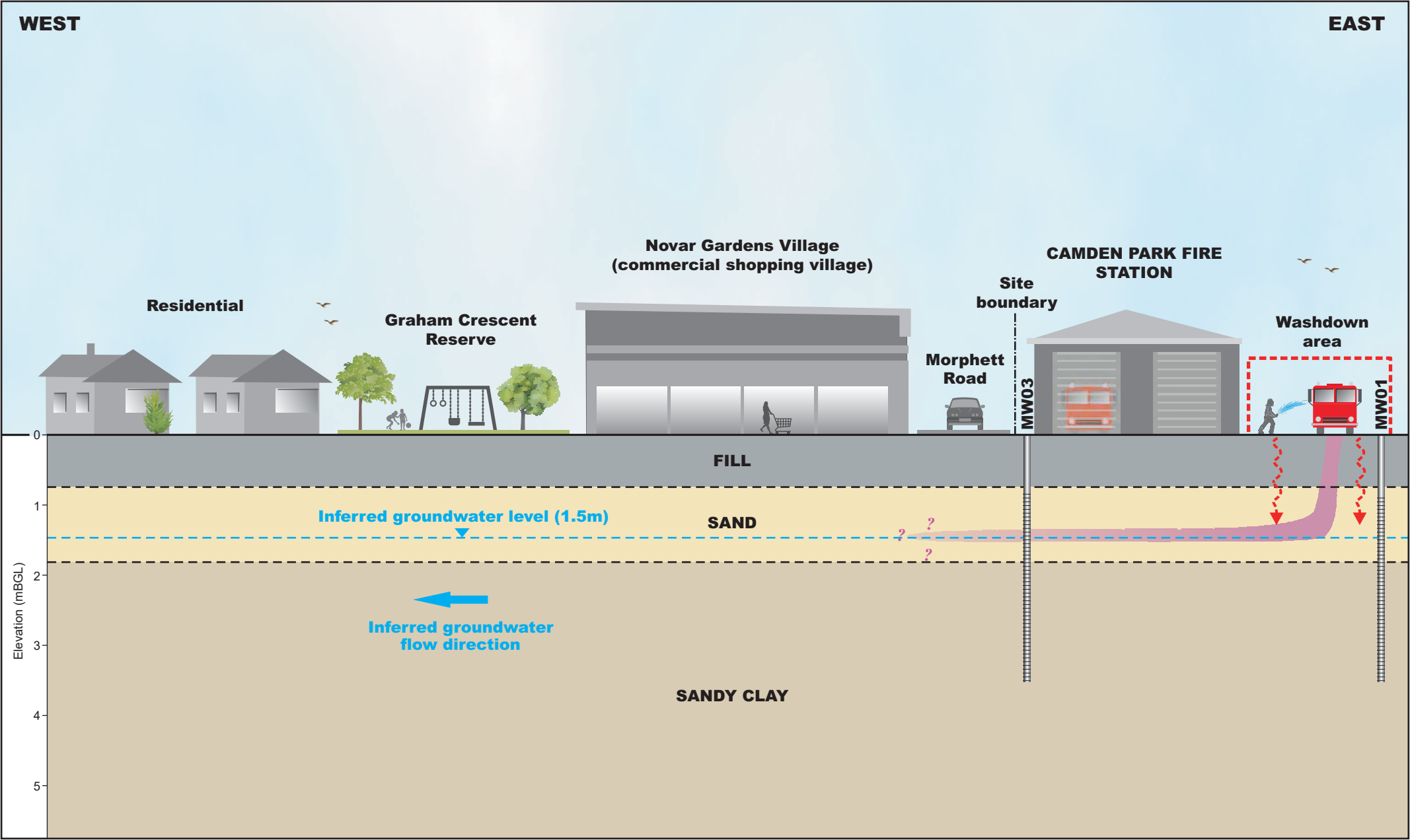
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FIGURE 6

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LEGEND

PFAS infiltration

Inferred PFAS

Conceptual diagram only - scale is approximate

SA MFS
Camden Park DSI
65 Morphet Road, Camden Park, SA 5038

Conceptual site model cross section

Project No. 12616808
Revision No. A
Date 18/12/2023

FIGURE 7

AUL\launceston\Projects\Admin\Graphics\12616808\12616808_LST_01.cdr

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

Appendices

Appendix A

SA EPA Letter GENI 62917

OFFICIAL



Environment Protection Authority

GPO Box 2607 Adelaide SA 5001

T (08) 8204 2004

Country areas 1800 623 445

EPA GENI 62917

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: Various Metropolitan Fire Service (MFS) Fire Stations, South Australia

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

- *MFS 17 Fire Stations PFAS Risk Profiling*, prepared by GHD and dated 26 October 2022.

The above report documents a desktop risk profiling and prioritisation assessment completed for 17 MFS stations previously identified as containing PFAS contamination, based on limited site sampling completed in 2019 (GHD 2019)¹.

The EPA requests that you submit a plan of proposed works and associated timelines to address the highest risk sites by **30 June 2023**.

If you agree to undertake the above listed works it is requested that you submit written acknowledgement to the EPA stating as such. If you wish to discuss potential alterations to the recommended works or delivery date please contact the EPA as soon as possible.

It is not clear in the above report whether stations where no soil sampling was completed, or where the limited sampling showed no site contamination, were considered as part of the risk screening assessment. The EPA notes that the sampling documented in GHD (2019) was highly limited and may not capture all potential PFAS source areas at a station. The EPA recommends that these stations be risk profiled if not undertaken previously.

Please provide a copy of this letter to your engaged consultant to assist them in developing a scope of works for the relevant sites. 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 matter please contact Brooke Ryan on (08) 8204 8525 or at brooke.ryan2@sa.gov.au.

Yours sincerely

A handwritten signature in cursive script that reads 'H Custance'.

Hannah Custance

PRINCIPAL ADVISER, SITE CONTAMINATION

ENVIRONMENT PROTECTION AUTHORITY

Date: 1 February 2023

Cc: Ben Petticrew, Technical/Project Director – Contamination Assessment and Remediation, GHD (ben.petticrew@ghd.com)

¹ *MFS State Wide Appliance and Station Sampling*, prepared by GHD and dated May 2019.

Appendix B

Site Photographs

Appendix B – Photo Log

Description	Photograph
Photo 1: View of the front entrance looking east from Morphett Road	
Photo 2: drain on northern boundary	

Description	Photograph
Photo 3: Wash down area facing east from rear of MFS building	
Photo 4: Wash down area facing south-east from rear of MFS building	

Description	Photograph
Photo 5: Former AFFF pod storage area at western site boundary	 A red and yellow container labeled 'SPECIAL OPERATIONS SUPPORT P09' and 'SOS' is parked on a paved area. A red forklift is visible to the right of the container. The container has yellow and black hazard stripes and a sign that reads 'NO PARKING IN FRONT OF POD'.
Photo 6: Drain in south-west corner of site	 A paved area with a drain in the south-west corner of the site. The drain is a square metal grate set into a paved surface. A concrete wall is visible in the background.

Appendix C

MFS Surveys

MFS Station – AFFF Historical Use Questionnaire

Please distribute the following questionnaire to nominated MFS personnel who have worked at MFS sites when active use of AFFF (*aqueous film-forming foam, firefighting foam*) occurred before it was phased out in 2016. When applicable, please annotate key site features on the site plans attached at the end of this questionnaire.

MFS Station: Camden Park SAMFS Fire Station

Name: REDACTED

Position when working at the site:

Phone number: REDACTED

Email: REDACTED

Date of response: 20/06/2022

Item	Question	Response
1	<i>When did you start working at this station?</i>	
2	<i>How long have you worked at this station?</i>	
3	<i>Can you describe where stormwater from the site is usually discharged to (e.g. stormwater pit, nearby creek / pond, street gutter)?</i>	Stormwater is collected in nine stormwater drains along the eastern (5) and southern (4) site boundaries and discharged off-site into the stormwater drain along Albert Ave. A control valve regulates the discharge into the Albert Ave.
4	<i>Can you describe any changes in how stormwater has been managed at the site over time?</i>	Interviewees were not aware of any changes since construction of the fire station in 1993.
5	<i>Is stormwater harvested within the site?</i>	No
5.1	<i>If yes, please describe where and how stormwater is harvested.</i>	NA
5.2	<i>For what purposes is stormwater harvested?</i>	NA
6	<i>Are there groundwater wells / bores at the site?</i>	
6.1	<i>If yes, for what purpose is groundwater used at the site?</i>	

Item	Question	Response
6.2	<i>Where are the groundwater well / bores located on site? Please mark the location on the attached site plan.</i>	
7	<i>Date when AFFF was first used on site?</i>	
8	<i>Can you provide the product names of any AFFF used on the site? (e.g. Ansulite, 3M Light Water)</i>	
9	<i>Was AFFF used in regular training exercises? If so:</i>	Training was not conducted at Camden Park Station.
9.1	<i>How often was the training? (e.g. weekly, monthly, quarterly)</i>	NA
9.2	<i>Can you describe the location of the training areas and annotate them on the site plan?</i>	NA
9.3	<i>Can provide an estimate of how much AFFF was used in each training?</i>	NA
9.4	<i>Was the training ground sealed / open?</i>	NA
9.5	<i>Was AFFF dispersed aerially? If so, please indicate the maximum extent on the site plan?</i>	NA
9.6	<i>When was the date of the last training event that included the use of AFFF?</i>	NA
10	<i>Please describe how the waste water was managed following training events? Specifically, was there a recycling system, storage pond, storage tanks or drains? Please annotate waste water discharge point / pathways on the site plan.</i>	NA
11	<i>Did any waste water flow into drains that directed the waste water off-site? Please annotate the waste water discharge points / pathways on the site plan.</i>	NA
12	<i>Were there any changes how the waste water was managed over time? If so, please describe the changes.</i>	NA
13	<i>Is there any inventory of AFFF use for the site?</i>	No

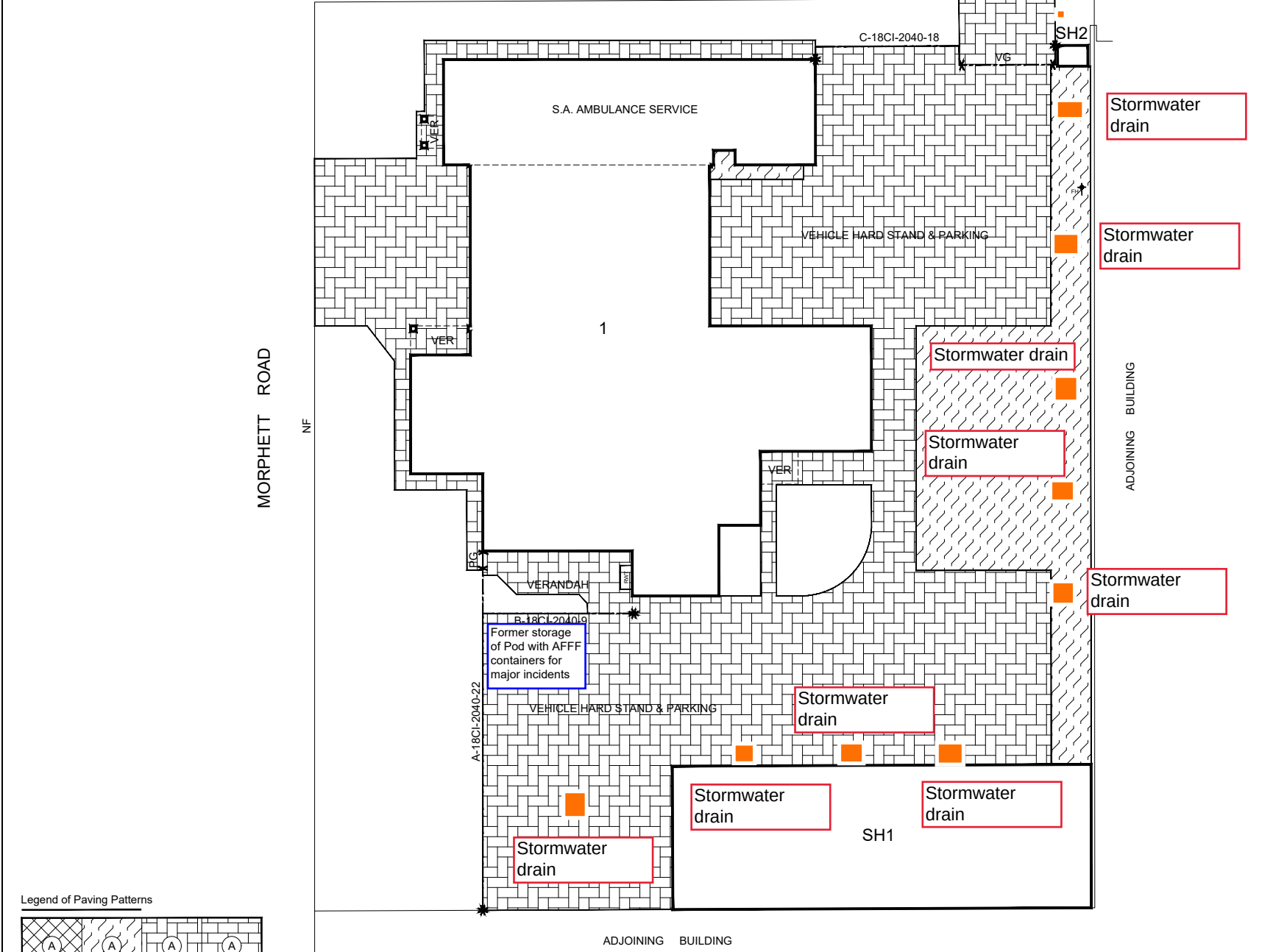
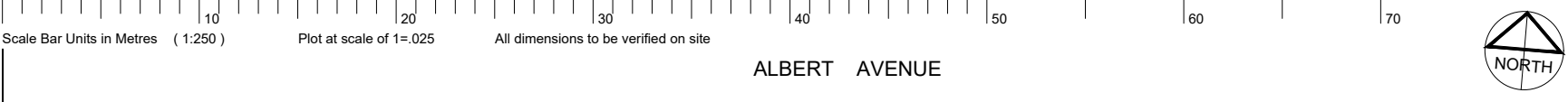
Item	Question	Response
14	<i>Can you estimate the total volume of AFFF used on site before it was phased out in 2016?</i>	
15	<i>Where was AFFF stored on site? Please annotate the storage location on the site plan.</i>	In firefighting appliances and in a special pod (see photo and site map) for major incidents. The pod was stored at the western site boundary.
15.1	<i>What type and size of storage containers were used to store AFFF on site?</i>	Appliances: separate tank with ~150-180 L capacity Pod: ~400-500 L square plastic containers
15.2	<i>What is the number of storage containers or the total volume of AFFF that was typically stored on site at any given time prior to 2016?</i>	
16	<i>Please describe where and how AFFF was transferred from storage containers to the fire trucks / fire-fighting appliances. What equipment was used to transfer the AFFF?</i>	AFFF was not transferred at Camden Pk. AFFF was filled into the appliances or the containers in the pod at Adelaide Station.
17	<i>How were spent drums of AFFF disposed of?</i>	NA
18	<i>Were there any wash down areas for fire trucks, equipment or AFFF containers? If so:</i>	Appliances and equipment were washed down on the concrete pad / pavers along the eastern site boundary.
18.1	<i>How was the waste water from such areas managed? (e.g. recycling, treatment, storage pond or discharge to drains)</i>	Same as stormwater: collected in stormwater drain and discharged into public stormwater drain in Albert Ave. No recycling.
18.2	<i>Were there any changes how the waste water was managed over? If so, please describe the changes.</i>	No
19	<i>Please describe / annotate the specific location(s) of any other chemical storage facilities (including fuel and oil) and describe the type and typical use of those chemicals.</i>	Household amounts of weedkiller and household cleaners
20	<i>Is there an incident log / register for the site?</i>	

Item	Question	Response
21	<i>Are you aware of any AFFF (or other chemical) releases that may have occurred outside of typical application scenarios? If so:</i>	AFFF tank of an appliance had to be drained -> release of ~1500-1800 L of foam plus rinse water.
21.1	<i>When did such release(s) happen?</i>	
21.2	<i>What substance(s) was/were released?</i>	AFFF
21.3	<i>Where did such release(s) happen? Please annotate the release point(s) on the site plan.</i>	Wash down area along eastern site boundary
21.4	<i>Where was the released AFFF or chemical discharged to? Please annotate the discharge point(s) on the site plan.</i>	Stormwater drain
22	<i>Are there areas of the site where training activities and / or AFFF release(s) have historically occurred that are now unused or have been built on?</i>	No
23	<i>Have there been any significant bulk earthworks on the Station site that resulted in soil being relocated from one area to another?</i>	No
24	<i>Please describe any changes to the Station that you are aware of with respect to the storage and use of AFFF.</i>	Pod with AFFF containers moved from Camden Pk to Adelaide station.

Any other comments or notes.

Potential receptor: Sturt River to the SW.

Surrounding land use: commercial / industrial to north (other side of Albert Ave), south, east and west (other side of Morphett Rd). Residential beyond Morphett Rd to NW and SW.



Legend of Paving Patterns

Bitumen Paving Ansi 37-90	Concrete Paving Flex 45°	Concrete Pavers 45° AR-Hbone	Clay Brick Pavers Brick 90°

BUILDINGS

1 FIRE & AMBULANCE STATION

SH1 COLORBOND GARAGE & STORE

SH2 COLORBOND DRY CLEANING STORE

PAVING DETAILS: Location, Type, Fail year, Area (sq ms)

A	-	-	-	B	-	-	-

FENCES *code-height-type-fail date-length (ms)*

CI	corrugated iron	PW	post and wire
CM	chain mesh	WM	weld mesh
GT	galtube	NF	not fenced
PG	pedestrian gate	VG	vehicle gate

WM Water Meter Fence junction

GM Gas Meter PMT Pad mtd trans

CAMDEN PARK SAMFS FIRE STATION

65 MORPHETT ROAD CAMDEN PARK 5038

Government of South Australia

Department of Planning, Transport and Infrastructure

Asset no.	09160	Client.	SAMFS
DTEI Office.	ADELAIDE	Sheet.	1 of 1
Created by.	Survcad	R.L.Chapman	May 2010
Modified by.	Archink	A Bentley	Mar 2020
Audited by.	-	-	-
Title details. refer layer " site-allotment "			
Site area.	0.2775 ha	Accuracy.	Site Survey
Strategic Asset Management Information System Plan			

SAMIS

09160

[illegible]Department of Planning,
Transport and Infrastructure

SAMIS 09160-01-1

ALBERT AVENUE

NF

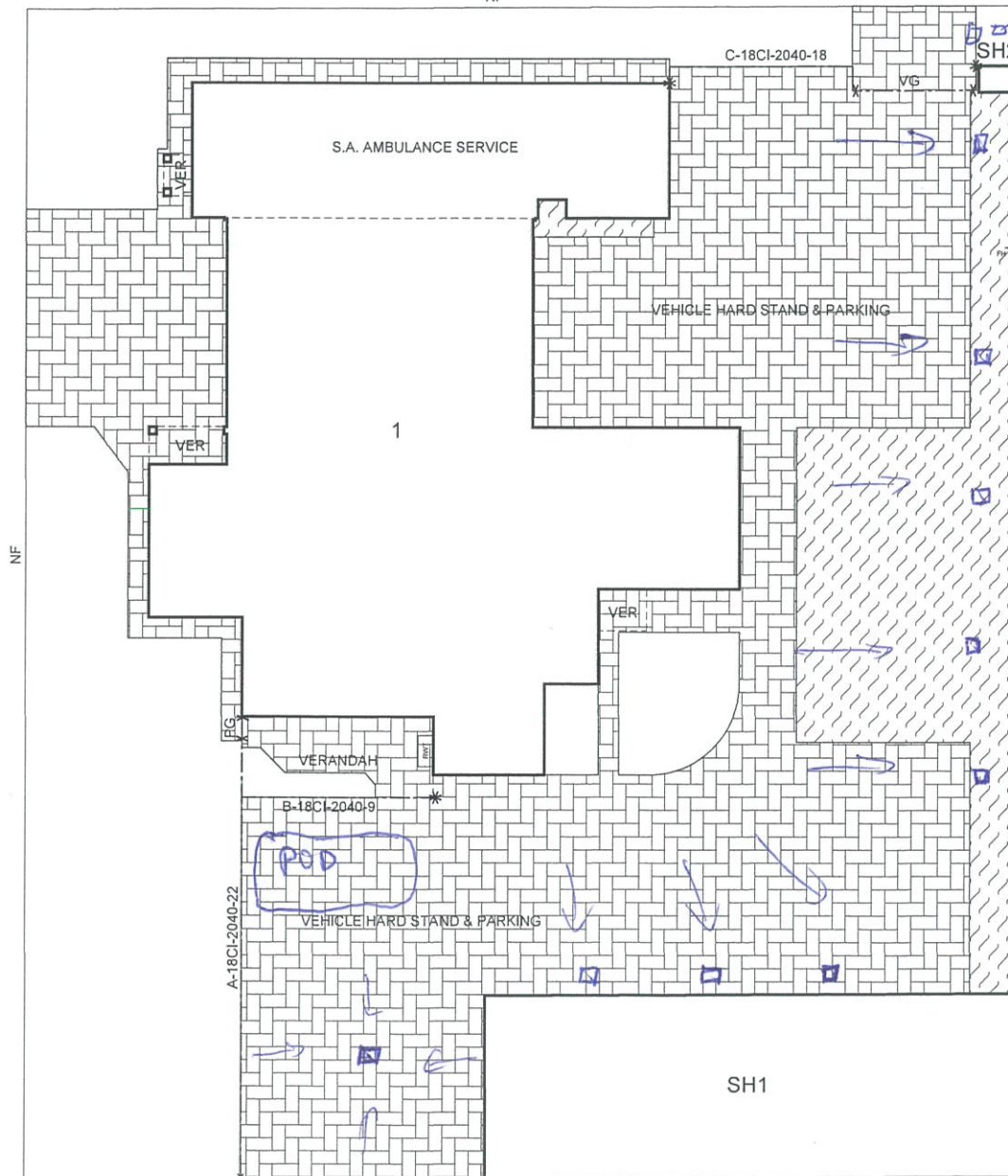


BUILDINGS

1 FIRE & AMBULANCE STATION

SH1 COLORBOND GARAGE & STORE
SH2 COLORBOND DRY CLEANING STORE

MORPHETT ROAD



Legend of Paving Patterns

Bitumen Paving Ansi 37-90°	Concrete Paving Flex 45°	Concrete Pavers 45° AR-Hbone	Clay Brick Pavers Brick 90°

POD with big square plastic containers ~ 400-500L for big incidents
Now stored at Adelaide Shm. ; no known incidents

ADJOINING BUILDING

PAVING DETAILS: Location, Type, Fail year, Area (sq ms)

A - - - B - - -

FENCES * code-height-type-fail date-length (ms) *

CI corrugated iron PW post and wire

CM chain mesh WM weld mesh

GT galtube NF not fenced

PG pedestrian gate VG vehicle gate

WM Water Meter * Fence junction

GM Gas Meter [PMT] Pad mtd trans

CAMDEN PARK SAMFS FIRE STATION 65 MORPHETT ROAD CAMDEN PARK 5038



Government of South Australia
Department of Planning,
Transport and Infrastructure

Asset no. 09160 Client. SAMFS

DTEI Office. ADELAIDE Sheet. 1 of 1

Created by. Survcad R.L.Chapman May 2010

Modified by. Archink A Bentley Mar 2020

Audited by. - - -

Title details. refer layer " site-allotment "

Site area. 0.2775 ha Accuracy. Site Survey

Strategic Asset Management Information System Plan

SAMIS 09160

MFS Station – AFFF Historical Use Questionnaire

Please distribute the following questionnaire to nominated MFS personnel who have worked at MFS sites when active use of AFFF (*aqueous film-forming foam, firefighting foam*) occurred before it was phased out in 2016. When applicable, please annotate key site features on the site plans attached at the end of this questionnaire.

MFS Station: **Camden Park SAMFS Fire Station**

Name: [REDACTED]

Position when working at the site:

Phone number:

Email:

Date of response: *20-06-2022*

Item	Question	Response
1	When did you start working at this station?	
2	How long have you worked at this station?	
3	Can you describe where stormwater from the site is usually discharged to (e.g. stormwater pit, nearby creek / pond, street gutter)?	<i>Stormwater is collected in nine stormwater drains along the eastern (5) and southern site boundaries. The stormwater is discharged into the public stormwater drain in Allot Ave.</i>
4	Can you describe any changes in how stormwater has been managed at the site over time?	
5	Is stormwater harvested within the site?	
5.1	If yes, please describe where and how stormwater is harvested.	
5.2	For what purposes is stormwater harvested?	
6	Are there groundwater wells / bores at the site?	
6.1	If yes, for what purpose is groundwater used at the site?	



MFS Station – AFFF Historical Use Questionnaire

Please distribute the following questionnaire to nominated MFS personnel who have worked at MFS sites when active use of AFFF (*aqueous film-forming foam, firefighting foam*) occurred before it was phased out in 2016. When applicable, please annotate key site features on the site plans attached at the end of this questionnaire.

MFS Station: Camden Park SAMFS Fire Station

Name:

Position when working at the site:

Phone number:

Email:

Date of response:

Item	Question	Response
1	When did you start working at this station?	1998
2	How long have you worked at this station?	24 years
3	Can you describe where stormwater from the site is usually discharged to (e.g. stormwater pit, nearby creek / pond, street gutter)?	To Sturt Creek.
4	Can you describe any changes in how stormwater has been managed at the site over time?	No changes.
5	Is stormwater harvested within the site?	NO
5.1	If yes, please describe where and how stormwater is harvested.	
5.2	For what purposes is stormwater harvested?	
6	Are there groundwater wells / bores at the site?	unknown
6.1	If yes, for what purpose is groundwater used at the site?	

→ The Power of Commitment

Item	Question	Response
6.2	Where are the groundwater well / bores located on site? Please mark the location on the attached site plan.	
7	Date when AFFF was first used on site?	1994
8	Can you provide the product names of any AFFF used on the site? (e.g. Ansulite, 3M Light Water)	
9	Was AFFF used in regular training exercises? If so:	NO
9.1	How often was the training? (e.g. weekly, monthly, quarterly)	
9.2	Can you describe the location of the training areas and annotate them on the site plan?	Rear yard
9.3	Can provide an estimate of how much AFFF was used in each training?	NO
9.4	Was the training ground sealed / open?	paved.
9.5	Was AFFF dispersed aerially? If so, please indicate the maximum extent on the site plan?	unknown
9.6	When was the date of the last training event that included the use of AFFF?	unknown
10	Please describe how the waste water was managed following training events? Specifically, was there a recycling system, storage pond, storage tanks or drains? Please annotate waste water discharge point / pathways on the site plan.	To drain
11	Did any waste water flow into drains that directed the waste water off-site? Please annotate the waste water discharge points / pathways on the site plan.	yes
12	Were there any changes how the waste water was managed over time? If so, please describe the changes.	NO
13	Is there any inventory of AFFF use for the site?	NO

Item	Question	Response
14	Can you estimate the total volume of AFFF used on site before it was phased out in 2016?	UNKNOWN
15	Where was AFFF stored on site? Please annotate the storage location on the site plan.	REAR SHED. @ POOS.
15.1	What type and size of storage containers were used to store AFFF on site?	~~200L~~ 44 GAL x 4
15.2	What is the number of storage containers or the total volume of AFFF that was typically stored on site at any given time prior to 2016?	unknown
16	Please describe where and how AFFF was transferred from storage containers to the fire trucks / fire-fighting appliances. What equipment was used to transfer the AFFF?	
17	How were spent drums of AFFF disposed of?	unknown
18	Were there any wash down areas for fire trucks, equipment or AFFF containers? If so:	
18.1	How was the waste water from such areas managed? (e.g. recycling, treatment, storage pond or discharge to drains)	
18.2	Were there any changes how the waste water was managed over? If so, please describe the changes.	NO
19	Please describe / annotate the specific location(s) of any other chemical storage facilities (including fuel and oil) and describe the type and typical use of those chemicals.	
20	Is there an incident log / register for the site?	

Item	Question	Response
21	Are you aware of any AFFF (or other chemical) releases that may have occurred outside of typical application scenarios? If so:	NO
21.1	When did such release(s) happen?	
21.2	What substance(s) was/were released?	
21.3	Where did such release(s) happen? Please annotate the release point(s) on the site plan.	
21.4	Where was the released AFFF or chemical discharged to? Please annotate the discharge point(s) on the site plan.	
22	Are there areas of the site where training activities and / or AFFF release(s) have historically occurred that are now unused or have been built on?	
23	Have there been any significant bulk earthworks on the Station site that resulted in soil being relocated from one area to another?	NO
24	Please describe any changes to the Station that you are aware of with respect to the storage and use of AFFF.	

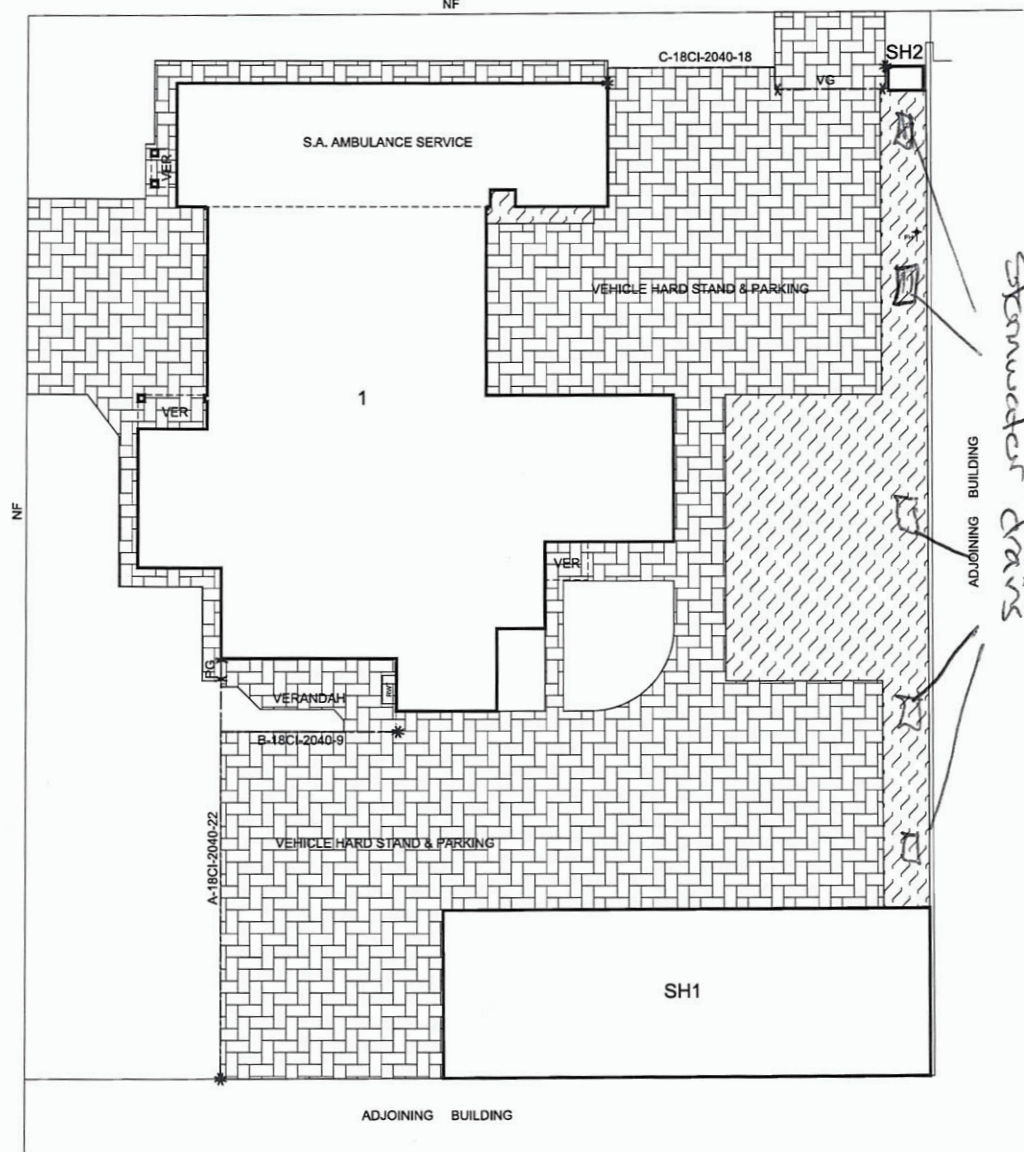
Any other comments or notes.

Scale Bar Units in Metres (1:250) Plot at scale of 1=0.025 All dimensions to be verified on site

ALBERT AVENUE



MORPHETT ROAD



Legend of Paving Patterns

Bitumen Paving Ansi 37-90°	Concrete Paving Flex 45°	Concrete Pavers 45° AR-Hbone	Clay Brick Pavers Brick 90°

BUILDINGS

1 FIRE & AMBULANCE STATION

SH1 COLORBOND GARAGE & STORE

SH2 COLORBOND DRY CLEANING STORE

PAVING DETAILS: Location, Type, Fail year, Area (sq ms)

A - - - B - - -

FENCES * code-height-type-fail date-length (ms) *

CI corrugated iron PW post and wire

CM chain mesh WM weld mesh

GT galutube NF not fenced

PG pedestrian gate VG vehicle gate

⊕-WM Water Meter * Fence junction

⊕-GM Gas Meter [PMT] Pad mtd trans

**CAMDEN PARK
SAMFS FIRE STATION
65 MORPHETT ROAD
CAMDEN PARK 5038**



Government of South Australia
Department of Planning,
Transport and Infrastructure

Asset no. 09160 Client. SAMFS

DTEI Office. ADELAIDE Sheet. 1 of 1

Created by. Survcad R.L.Chapman May 2010

Modified by. Archink A Bentley Mar 2020

Audited by. - - -

Title details. refer layer * site-allotment *

Site area. 0.2775 ha Accuracy. Site Survey

Strategic Asset Management Information System Plan

SAMIS 09160

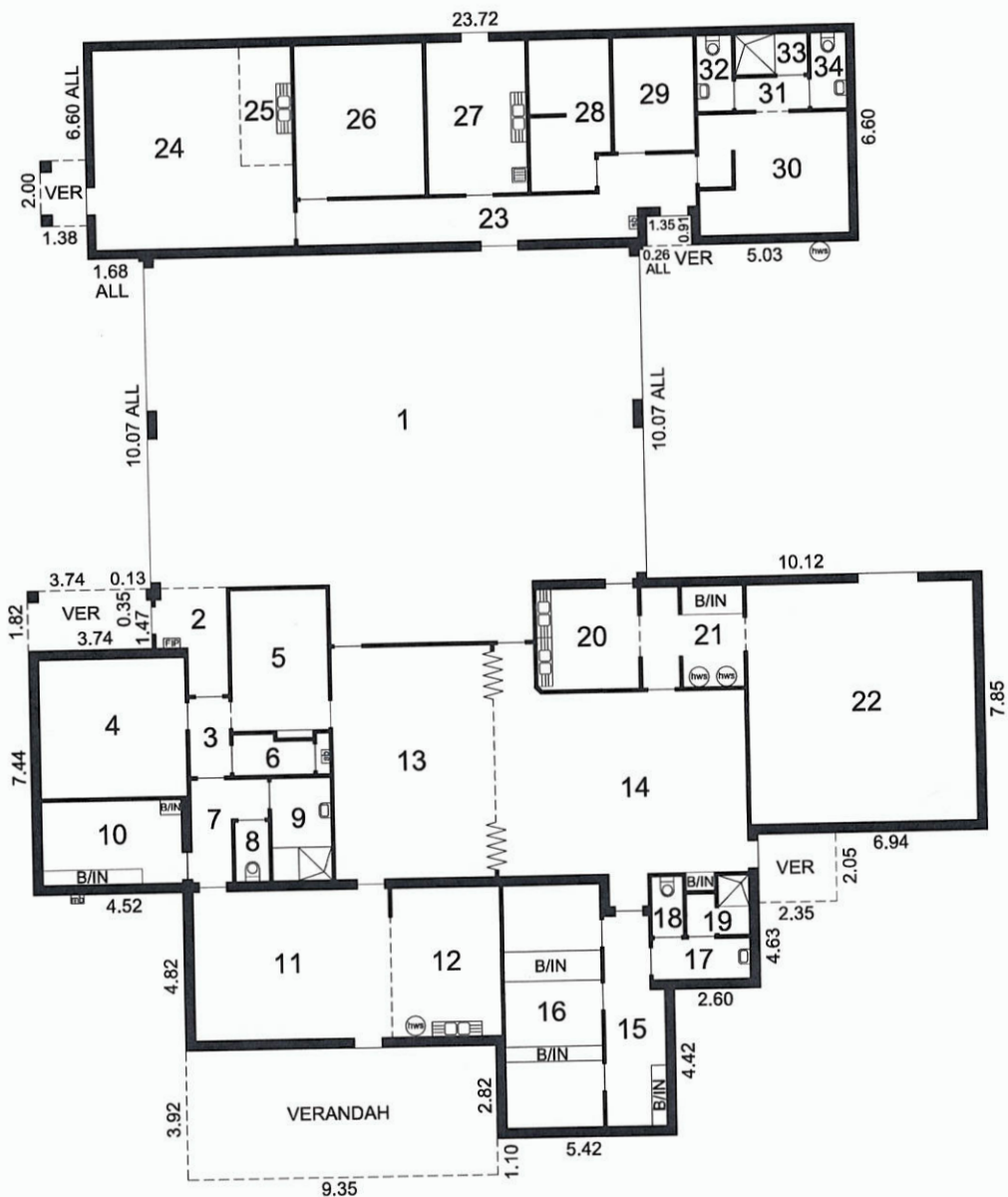
Scale Bar Units in Metres (A4 1:200)

Plot at a scale of 1=0.2

All dimensions to be verified on site



ROOMS 23 - 34 ARE OCCUPIED BY
THE S.A. AMBULANCE SERVICE



Asset Name **CAMDEN PARK SAMFS FIRE STATION**

Building Use **FIRE & AMBULANCE STATION**

Created by. *SurvCad* Drawn *R.L.Chapman* Date *May 2010*

Modified by. *Archink* Drawn *A Bentley* Date *Mar 2020*

Bldg area m² **648** Ver area m² **52** Plan ref. -



Government of South Australia

Department of Planning,
Transport and Infrastructure

Strategic Asset Management Information System Plan

SAMIS 09160-01-1

"B" SHIFT.
✓



MFS Station – AFFF Historical Use Questionnaire

Please distribute the following questionnaire to nominated MFS personnel who have worked at MFS sites when active use of AFFF (*aqueous film-forming foam, firefighting foam*) occurred before it was phased out in 2016. When applicable, please annotate key site features on the site plans attached at the end of this questionnaire.

MFS Station: Camden Park SAMFS Fire Station
Name: [REDACTED]

Position when working at the site: F/ Email:

Phone number: Date of response: 01

2077-2022

Response

Item Question

2019

1 When did you start working at this station?

2 How long have you worked at this station?

3.

3 Can you describe where stormwater from the site is usually discharged to (e.g. stormwater pit, nearby creek / pond, street gutter)?

STREET -> STREET DRAIN

4 Can you describe any changes in how stormwater has been managed at the site over time?

No.

5 Is stormwater harvested within the site?

No.

5.1 If yes, please describe where and how stormwater is harvested.

5.2 For what purposes is stormwater harvested?

6 Are there groundwater wells / bores at the site?

No.

6.1 If yes, for what purpose is groundwater used at the site?

→ The Power of Commitment

Item	Question	Response
6.2	Where are the groundwater well / bores located on site? Please mark the location on the attached site plan.	
7	Date when AFFF was first used on site?	UNKNOWN.
8	Can you provide the product names of any AFFF used on the site? (e.g. Ansulite, 3M Light Water)	
9	Was AFFF used in regular training exercises? If so:	No.
9.1	How often was the training? (e.g. weekly, monthly, quarterly)	
9.2	Can you describe the location of the training areas and annotate them on the site plan?	
9.3	Can provide an estimate of how much AFFF was used in each training?	
9.4	Was the training ground sealed / open?	
9.5	Was AFFF dispersed aerially? If so, please indicate the maximum extent on the site plan?	
9.6	When was the date of the last training event that included the use of AFFF?	
10	Please describe how the waste water was managed following training events? Specifically, was there a recycling system, storage pond, storage tanks or drains? Please annotate waste water discharge point / pathways on the site plan.	
11	Did any waste water flow into drains that directed the waste water off-site? Please annotate the waste water discharge points / pathways on the site plan.	
12	Were there any changes how the waste water was managed over time? If so, please describe the changes.	
13	Is there any inventory of AFFF use for the site?	

Item	Question	Response
14	Can you estimate the total volume of AFFF used on site before it was phased out in 2016?	
15	Where was AFFF stored on site? Please annotate the storage location on the site plan.	
15.1	What type and size of storage containers were used to store AFFF on site?	
15.2	What is the number of storage containers or the total volume of AFFF that was typically stored on site at any given time prior to 2016?	
16	Please describe where and how AFFF was transferred from storage containers to the fire trucks / fire-fighting appliances. What equipment was used to transfer the AFFF?	
17	How were spent drums of AFFF disposed of?	
18	Were there any wash down areas for fire trucks, equipment or AFFF containers? If so:	
18.1	How was the waste water from such areas managed? (e.g. recycling, treatment, storage pond or discharge to drains)	
18.2	Were there any changes how the waste water was managed over? If so, please describe the changes.	
19	Please describe / annotate the specific location(s) of any other chemical storage facilities (including fuel and oil) and describe the type and typical use of those chemicals.	
20	Is there an incident log / register for the site?	

Item	Question	Response
21	Are you aware of any AFFF (or other chemical) releases that may have occurred outside of typical application scenarios? If so:	No.
21.1	When did such release(s) happen?	—
21.2	What substance(s) was/were released?	—
21.3	Where did such release(s) happen? Please annotate the release point(s) on the site plan.	—
21.4	Where was the released AFFF or chemical discharged to? Please annotate the discharge point(s) on the site plan.	—
22	Are there areas of the site where training activities and / or AFFF release(s) have historically occurred that are now unused or have been built on?	—
23	Have there been any significant bulk earthworks on the Station site that resulted in soil being relocated from one area to another?	No.
24	Please describe any changes to the Station that you are aware of with respect to the storage and use of AFFF.	—

Any other comments or notes.



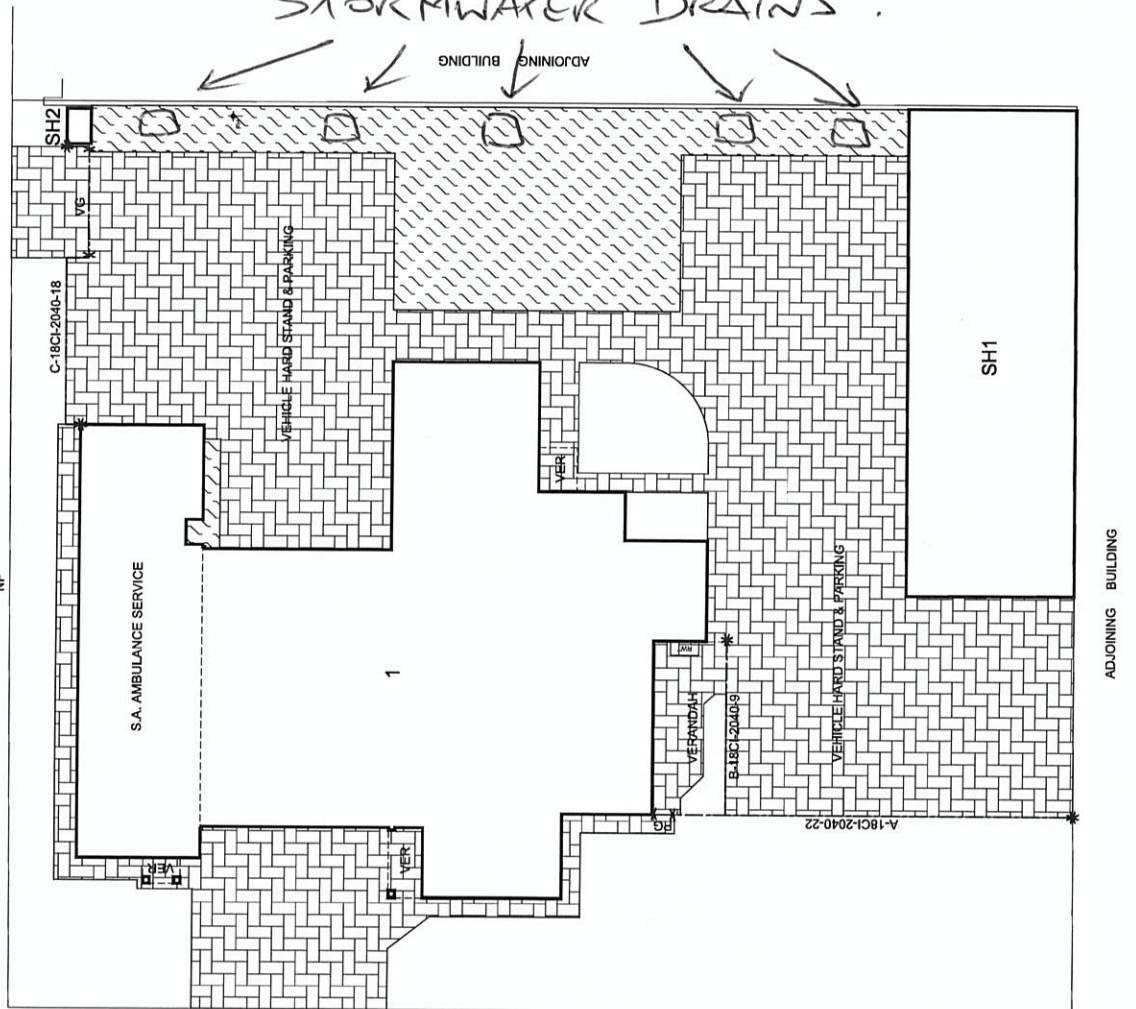
BUILDINGS

- 1 FIRE & AMBULANCE STATION
- SH1 COLORBOND GARAGE & STORE
- SH2 COLORBOND DRY CLEANING STORE

Scale Bar Units in Metres (1:250) Plot at scale of 1:1025 All dimensions to be verified on site

ALBERT AVENUE

NF



MORPHETT ROAD

NF

PAVING DETAILS: Location, Type, Fall year, Area (sq ms)

A - - - - - B - - - - -

FENCES * code-height-type-fall date-length (ms) *

CI corrugated iron PW post and wire

CM chain mesh WM weld mesh

GT galutube NF not fenced

PG pedestrian gate VG vehicle gate

WM Water Meter * Fence junction

GM Gas Meter * Pad mid trans

PMI Pad mid trans

CAMDEN PARK

SAMFS FIRE STATION

65 MORPHETT ROAD

CAMDEN PARK 5038



Government of South Australia
Department of Planning,
Transport and Infrastructure

Asset no. 09160 Client SAMFS

DTEI Office ADELAIDE Sheet 1 of 1

Created by: Survcad R.L. Chapman May 2010

Modified by: Archink A Bentley Mar 2020

Audited by: -

Title details: refer layer "site-allotment"

Site area: 0.2775 ha Accuracy: Site Survey

Strategic Asset Management Information System Plan

SAMIS 09160

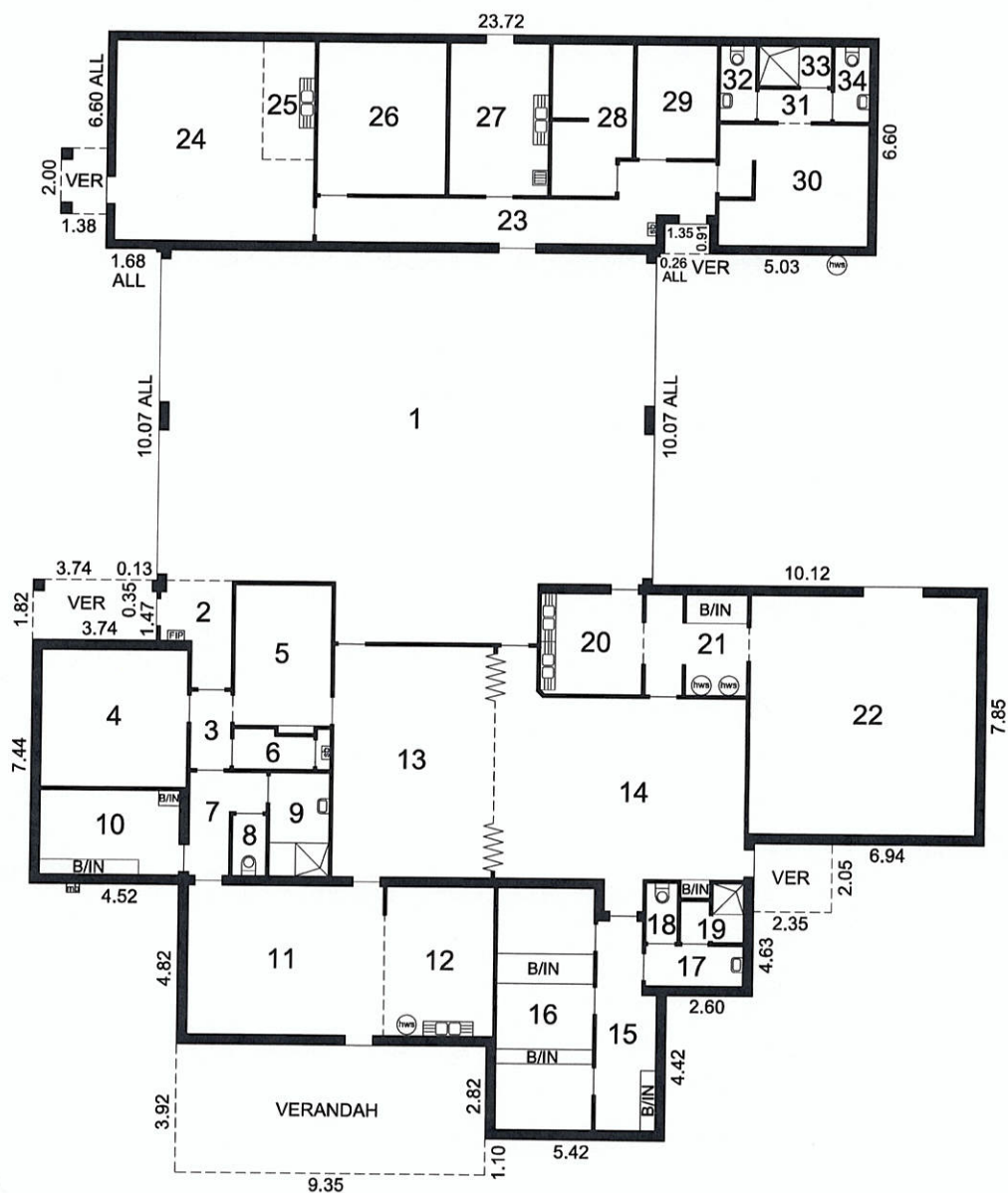
Legend of Paving Patterns

Blank	Concrete	Concrete	Clay Brick
Paving	Paving	Paving	Paving
Ans: 37-50° Flex 45°	Ans: 37-50° Flex 45°	Ans: 37-50° Flex 45°	Ans: 37-50° Flex 45°

Scale Bar Units in Metres (A4 1:200) Plot at a scale of 1=0.2 All dimensions to be verified on site



ROOMS 23 - 34 ARE OCCUPIED BY
THE S.A. AMBULANCE SERVICE



Asset Name **CAMDEN PARK SAMFS FIRE STATION**

Building Use **FIRE & AMBULANCE STATION**

Created by. *Surv cad* Drawn *R.L.Chapman* Date *May 2010*

Modified by. *Archink* Drawn *A Bentley* Date *Mar 2020*

Bldg area m² **648** Ver area m² **52** Plan ref. **-**



Government of South Australia

Department of Planning,
Transport and Infrastructure

Strategic Asset Management Information System Plan

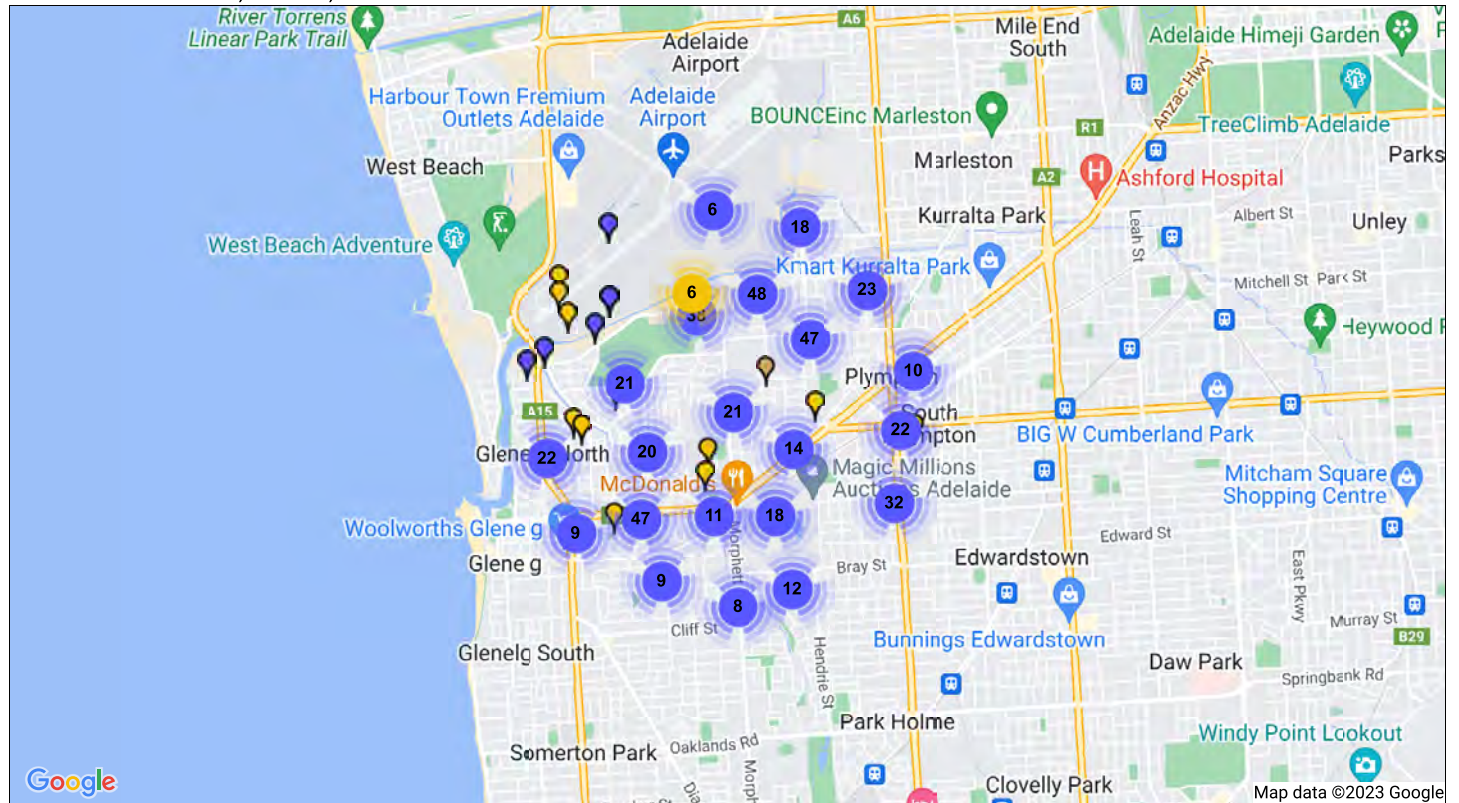
SAMIS 09160-01-1

Appendix D

SA WaterConnect Database



Circle Centre -34.9664,138.537, Radius 2km



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Groundwater Data Report



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	2.9	24/11/2023	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	94	-0.09	12/09/2023	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	0.97	12/09/2023	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						
6628-8099			9.14	9.14	4.57	07/05/1968			9170	07/05/1968	Qpah						
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

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
6628-8104	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	3.3	12/09/2023	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
6628-13271	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					
6628-13829	28/11/1986	6	6	6	1.5	17/12/1986	0.63	28/11/1986	2991	17/12/1986	Qhck	19157					
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					
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					

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
6628-14099	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					
6628-15436	15/01/1991		5	5	3	15/01/1991					Qhck	25057	OPR				DOM
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
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

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
6628-16783	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
6628-17191	28/04/1994		12	12							Qhck		UKN				
6628-17192	03/05/1994		5.4	5.4							Qhck		UKN				
6628-17360	19/07/1995	7	7	0			0.35	19/07/1995	17296	19/07/1995	Qpah	34606	ABD				DOM
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
6628-17653	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
6628-19062	12/06/1998	6	6	6	2.5	12/06/1998	0.2	12/06/1998			Qpah	45355					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
6628-19576	02/06/1999	5	5	5	2.13	02/06/1999			755	01/06/2002	Qpah	49702					MON
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

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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
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					

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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					
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					

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
6628-23585	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					
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	-4.76	12/09/2023	10	19/06/2010	1020	23/09/2014	Tomw(T2)	170282	OPR	ADE206	C	H	MON
6628-25428	28/06/2010	89	117	117	-4.67	12/09/2023	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

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
6628-26255	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
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	1284	03/11/2021	Tomw(T1)	239990	CSH				IRR
6628-27918	03/02/2014	4	10	10							Qpah	229703					INV
6628-27919	04/02/2014	8	11	11							Qpah	229704					INV
6628-27920	04/02/2014	11	11	11							Qpah	229705					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

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
6628-28708	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
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					INV
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	2	5	5								417792					ENV
6628-32057	01/08/2022	2	5	5								417793					ENV
6628-32058	01/08/2022	2	5	5								417794					ENV
6628-32059	08/08/2022	2	5	5								417796					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
6628-32060	08/08/2022	2	5	5								417795					ENV
6628-32061	08/08/2022	2	5	5								417797					ENV
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

480 records



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Appendix E

SSHIL Methodology

Our ref: 12602101

28 June 2023

Krystle Mitchell
Senior Scientific and Environment Officer
South Australian Metropolitan Fire Service
99 Wakefield Street
Adelaide, SA 5000

Derivation of site-specific health investigation levels for urban and regional fire stations – South Australia Metropolitan Fire Service (SA MFS)

Dear Krystle,

1. Introduction

This letter describes the derivation of site-specific health investigation levels (SSHILs) for per- and poly-fluoroalkyl substance (PFAS) contaminated soil at fire stations operated by the South Australia Metropolitan Fire Service (SA MFS). SSHILs have been derived for urban and regional settings based on the methodology provided in the following documents:

- Heads of EPAs Australia and New Zealand (HEPA) and the Australian Government Department of the Environment and Energy (DoEE) – *PFAS National Environmental Management Plan* (the 'PFAS NEMP') (HEPA, 2020)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPC, 2013) (the 'ASC NEPM')
- NSW and Office of Environment and Heritage (OEH, 2019) *Human health soil screening criteria for PFOS, PFHxS and PFOA*

1.1 Background

From 2007, SA MFS began phasing out the use of aqueous film-forming foam (AFFF) containing perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) as key constituents, due to concerns regarding the hazards posed by these compounds to human health and the environment. The SA MFS replaced all firefighting foam in 2016 to ensure that only fluorine-free foam was in use. Currently, state-wide, all SA MFS appliances carry firefighting foams that do not contain PFOS or PFOA and are fluorine-free. During 2017/2018, the SA MFS also removed all fire extinguishers containing PFAS. In 2018, SA MFS engaged GHD to provide ongoing environmental services and undertake site contamination assessments across many of their operational sites as well as risk profiling for their entire portfolio of sites to effectively manage the potential for PFAS contamination and any associated human health and ecological risks.

The PFAS NEMP provides generic health investigation levels (HILs) for PFOS, PFOA and perfluorohexane sulfonate (PFHxS) in soil in four land use settings, as summarised in Table 1 below. The land use settings considered in the PFAS NEMP are consistent with those that underpin the HILs presented for a variety of contaminants within the ASC NEPM. The derivation of the PFAS HIL values is described in detail by OEH (2019).

Table 1 Summary of exposure scenarios adopted to derive generic HILs.

Land use	HIL (mg/kg)	Exposure scenario description
HIL A Residential, with gardens /accessible soil	PFOS+PFHxS: 0.01 PFOA: 0.1	- Low-density residential settings with sizeable gardens and with areas of soil that are accessible - Gardens are assumed to consist of lawns, garden beds and small vegetable gardens and areas of fruit trees - Assumes home-grown produce provides up to 10% of fruit and vegetable intake (does not account for consumption of eggs from home poultry) - Site users are adults, children and infants who spend most of their time at home and use the outdoor areas of the residences on a frequent basis for activities such as gardening or recreation. This scenario assumes 20 hours a day spent indoors and 4 hours a day spent outdoors in direct contact with soil. - Children are the most sensitive human receptors. This scenario is protective of childcare centres, kindergartens, preschools and primary schools and their integral playgrounds.
HIL B Residential, with minimal opportunities for soil access	PFOS+PFHxS: 2 PFOA: 20	- High-density residential settings, such as unit blocks, where communal outdoor spaces are largely covered by permanent paving and with some small areas of landscaping or lawns - Assumes that there are minimal opportunities for direct access to soil by residents. There may be some potential for residents to inhale, ingest or come into direct dermal contact with dust particulates derived from the on-site soil. - Assumes no use of soil to produce vegetables, fruit or poultry - Site users are adults, children and infants who spend most of their time indoors with limited use of communal outdoor areas on site. This scenario assumes 20 hours a day spent indoors and 1 hour a day spent outdoors in direct contact with soil. - Children are the most sensitive human receptors
HIL C Public open space	PFOS+PFHxS: 1 PFOA: 10	- Parks, playgrounds, recreational areas and playing fields that are fully accessible to the public - These areas may contain lawns, gardens, vegetated areas, and walkways with some areas of exposed soil - Assumes no use of soil to produce vegetables, fruit or poultry - Site users are adults and children who may use the area for up to 2 hours a day, 7 days a week - Children are the most sensitive human receptors
HIL D Commercial/ industrial	PFOS+PFHxS: 20 PFOA: 50	- Commercial and/or industrial settings where the outdoor areas are largely (80%) covered by hardstand, possibly with some limited areas of landscaping or lawns - Site users are adult employees that spend up to 8 hours a day indoors and 1 hour a day outdoors for up to 240 days per year - There are minimal opportunities for direct access to soil. There is the potential for employees to inhale, ingest or come into direct contact with dust particulates derived from the soil on the site.

A review of Table 1 indicates that the typical usage patterns at SA MFS fire stations most closely align with the exposure assumptions that underpin the HIL D values. The following inconsistencies are however noted:

- The preliminary site investigations undertaken at SA MFS sites across South Australia has 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 of this, there may be greater opportunities for direct access to soil at SA MFS fire stations, including the ingestion of soil and soil-derived dust.
- The shifts worked by SA MFS firefighters do not align with the assumption of a standard working week than underpins the HIL D values

Given these factors, 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.

1.2 Objective of this report

The objective of this report is to derive SSHILs for PFOS+PFHxS and PFOA in soils that are protective of workers at SA MFS fire stations in typical urban and regional settings. The purpose of these SSHILs is to facilitate the screening assessment of soil datasets for human health risks.

2. Derivation methodology

The SSHILs have been calculated using the HILs spreadsheet (Excel format) provided on the ASC NEPM website¹. The algorithms underlying the HILs spreadsheet are detailed in Schedule B7 of the ASC NEPM. These algorithms were also used in the derivation of the HILs PFOS+PFHxS and PFOA, presented in Table 1 and as detailed by OEH (2019).

The process used to derive the SSHILs involved the following key steps:

- **Toxicity assessment:** which established the relationships between PFAS exposure and potential health and ecological effects, using published toxicological information
- **Exposure assessment:** which produced estimates of the PFAS exposure that may be experienced by users of SA MFS fire stations.
- **Risk characterisation:** which combines the results of the toxicity assessment and exposure assessment, to derive soil criteria that are protective of potential risks to the health of users of SA MFS fire stations.

The toxicity assessment and exposure assessment inputs used in the derivation of the SSHILs are detailed herein, with the SSHILs provided in Section 3.

2.1 Toxicity assessment methodology

A toxicity assessment determines whether human exposure to a chemical could cause an increase in the incidence of an adverse health condition (NEPC, 2013). The outcomes of the toxicity assessment process are a set of toxicity criteria that have been used to derive the SSHILs.

For most chemicals there is a dose below which no adverse health effect will occur (i.e., a threshold toxicant). PFAS have been linked with several threshold toxicities, including effects on cholesterol and immunotoxicity. Accordingly, the SSHILs focus on potential threshold risks linked to PFAS exposure. Chronic health risks for threshold chemicals are assessed by comparing the estimated intake with toxicity reference values (TRVs), which are a measure of tolerable daily exposure. The TRVs adopted in the derivation of the SSHILs are consistent with those that underpin the HIL D values presented in the PFAS NEMP, as detailed in Table 2.

The toxicity assessment process also considers the toxicokinetics of PFAS and in particular the tendency of PFAS to be absorbed via the various potential routes of exposure (i.e., ingestion, inhalation and dermal absorption). Consistent with the approach adopted by OEH (2019) the dermal uptake of PFAS has been assumed to be negligible and has not been included in the derivation of the SSHILs.

¹ <https://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox>

Table 2 Summary of toxicological input parameters used in the derivation of the SSHILs.

Chemical	Toxicity assessment input parameters	Source
Toxicity reference values		
PFOS, PFHxS (sum)	20 ng/kg/day	OEH (2019); FSANZ (2017)
PFOA	160 ng/kg/day	OEH (2019); FSANZ (2017)
Absorption parameters		
Dermal absorption	Negligible	OEH (2019)
Gastrointestinal absorption	100%	OEH (2019); FSANZ (2017)

2.2 Exposure assessment methodology

In an exposure assessment, appropriate exposure assumptions are identified for each exposure pathway, and these are used in conjunction with exposure modelling algorithms to estimate intakes of contaminants by the exposed receptors (NEPC, 2013).

The exposure assessment inputs adopted in the derivation of the SSHILs have primarily been sourced from OEH (2019), with adjustments made as appropriate, based on information provided by SA MFS. A summary of the adopted exposure assessment inputs and the rational underpinning the selected values is provided in Attachment 1. These inputs can be summarised as follows:

- *Firefighter physiology*: The ASC NEPM Schedule B7 provides standard exposure parameters for commercial / industrial scenarios, including factors such as the body weight and inhalation characteristics of adult workers. Consistent with the approach adopted by OEH (2019), these have been adopted in the derivation of SSHILs, as SA MFS firefighters will typically be physiologically consistent with the general population.
- *Exposure frequency and time onsite*: Information provided by SA MFS has been used to select appropriate input assumptions around exposure frequency and time spent onsite, as detailed in Section 2.2.1
- *Exposure to PFAS from external sources*: PFAS is present in a variety of domestic products and commercial applications and is ubiquitous in urban settings. Hence, SA MFS firefighters are likely to be exposed to PFAS from a variety of sources external to the fire stations, such as food, air, water and consumer products. The TRVs detailed in Section 2.1 are relevant to the PFAS intake from all sources. The HIL D presented in the PFAS NEMP were derived based on the conservative assumption that 80% of the exposure to PFAS experienced by workers originates from external sources, with 20% of the TRV allocated to PFAS in fire station soils. This conservative assumption has been retained in the derivation of SSHILs for SA MFS firefighters
- *Incidental soil ingestion rates*: The incidental soil ingestion rates for SA MFS firefighters have been assumed to be consistent with those experienced by adults in a residential setting (50 mg/day), rather than those adopted in the ASC NEPM and by OEH (2019) for commercial/industrial sites (25 mg/day). This approach is likely to be conservative but has been adopted to account for the extended shifts worked by firefighters in metropolitan areas and the substantial areas of unsealed ground that are present on some of the SA MFS fire stations.
- *Use of SA MFS fire stations by children*: Children have not been specifically included in the derivation of the SSHILs. It is understood that children do visit the SA MFS fire stations but that this does not occur with regularity. Hence, the SSHILs, which have been derived to be protective of firefighters employed at the fire stations, will also be adequately protective of the health children visiting less frequently.

- *Produce production and consumption*: Historically, produce gardens were present on a number of the SA MFS fire stations and it is understood that there was some concern that the time spent tending these gardens and consuming produce would be associated with increased levels of exposure to PFAS. In 2022 however, SA MFS issued a directive on advice from GHD and EPA that all fruit and vegetable plants be removed from fire stations and replaced with ornamental plants (refer to Attachment 2). Areas of ornamental landscaping are not inconsistent with the exposure assumptions underpinning the HIL D values and therefore adjustments to the exposure assumptions used to derive the SSHILs have not been made on this basis.

2.2.1 Firefighter shifts

As noted in Table 1, the generic HIL D values assume that workers spend up to 240 days a year at commercial/industrial sites: eight hours a day indoors and one hour a day outdoors. This is equivalent to a total yearly exposure of 2160 hours. Given that the shifts worked by firefighter in both urban and regional areas differ from this pattern, the specific exposure times provided by SA MFS have been adopted in the derivation of the SSHILs as follows:

- Metropolitan fire stations – SA MFS has indicated that firefighters typically work two 10-hour dayshifts and two 14-hours nightshifts followed by four days off work and that firefighters work for 6 months before taking 6 weeks of annual leave. This averages to 12-hour shifts for circa 150 days per year. This is equivalent to a total yearly exposure of 1800 hours, which is lower than the exposure assumption underpinning the generic HIL D values.
- Regional fire stations – SA MFS has indicated that firefighters can spend up to three hours a week at regional fire stations. This is equivalent to a total yearly exposure of 156 hours per year, which is substantially lower than the exposure assumption underpinning the generic HIL D.

3. Site-specific HILs for the screening of PFAS contaminated soils at SA MFS sites

The input parameters selected via the toxicity assessment and exposure assessment processes, as detailed in Sections 2.1 and 2.2 respectively, have been combined to calculate SSHILs for the screening of PFAS contaminated soils at SA MFS fire stations. The models used to calculate the SSHILs are presented in Attachment 3 and Table 3 summarises the derived SSHIL values.

Table 3 SSHILs derived for the screening of PFAS contaminated soil in urban and regional SA MFS fire stations

Fire station type	PFOS+PFHxS	PFOA*	Comment
Metropolitan	14 mg/kg	50 mg/kg	These SSHILs assumes four 12-hour shifts every eight days (i.e., four days at work and four days off)
Regional	40 mg/kg	50 mg/kg	These SSHILs assumes one 3-hour shift per week.
Notes: Although higher values were calculated using the toxicity and exposure assessment process, the SSHIL for PFOA has been set as 50 mg/kg in anticipation of the Stockholm Convention low content limit. This is consistent with the PFAS NEMP			

4. Closure

We trust that the information above is sufficient for SA MFS's purposes. Should you have any further questions on this document please do not hesitate to contact the undersigned.

Regards



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Senior Environmental Scientist
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Ben Petticrew
Technical Director
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5. References

- FSANZ. (2017). *Food Standards Australia New Zealand's (FSANZ) report on Perfluorinated Chemicals in Food*.
- HEPA. (2020). *PFAS National Environmental Management Plan - Version 2.0*.
- NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Amendment Measure*.
- OEH. (2019). *Human health soil screening criteria for PFOS, PFHxS and PFOA*.

Attachments

Attachment 1

**Summary of exposure assessment
inputs**

Summary of SA MFS sites - unsealed areas

Location (metro)	Unsealed area (m^2)	Total area (m^2)	% unsealed
Angle park	111254	153034	73%
Adelaide	115	20000	1%
St Marys	1229	4543	27%
Largs	1163	3316	35%
Woodville	141	2172	6%
Christie Downs	710	2321	31%
Camden Park	531	2771	19%
Oakden	1302	4802	27%
Port Adelaide	449	4349	10%
O'Halloran Hill	2959	7300	41%
Brooklyn Park	1090	3710	29%
Beulah Park	335	2791	12%
Elizabeth	100	3256	3%
Gawler	1300	3457	38%
Glen Osmond	180	3152	6%
Golden Grove	1172	3994	29%
Paradise	680	4090	17%
Prospect	580	2820	21%
Salisbury	2442	12607	19%
Seaford	2300	7450	31%
Mount Barker	362	2110	17%
	Unsealed Average	Total Area Average	% average
	815	4,913	17%
Max	111254	153034	73%
Min	100	2110	1%

Location (regional)	Unsealed area (m^2)	Total area (m^2)	% unsealed
Loxton	987	2154	46%
Moonta	1	920	0%
Whyalla	6224	11054	56%
Mt Gambier	1506	3884	39%
Kapunda	1	395	0%
Peterborough	519	994	52%
Port Pirie	7875	19297	41%
Port Augusta	961	2461	39%
Murray Bridge	796	2005	40%
Berri	583	3065	19%
Kadina	1	577	0%
Port Lincoln	420	6058	7%
Renmark	70	3573	2%
Tanunda	168	1438	12%
Victor Harbor	400	1847	22%
Walleroo	1032	1600	65%
	Unsealed Average	Total Area Average	% average
	222	2,276	10%
Max	7875	19297	65%
Min	1	395	0%

Summary of exposure parameters

Summary of Exposure Parameters	units	Parameter			Rationale
		HIL D	SA MFS SSHIL - Urban	SA MFS SSHIL - Regional	
Soil and Dust Ingestion Rate	mg/day	25	50	50	HIL D assumes that the incidental soil ingestion rate experienced by adults working for 8-hours on a commercial industrial site (25 mg/day) is likely to be ~50% of that experienced by adults in a residential setting (50 mg/day), given that waking hours are typically ~16-hours per day. The ASC NEPM residential soil ingestion rate has been adopted for SA MFS firefighters, given that substantial areas of unsealed ground are present on some of the SA MFS fire stations and firefighters may spend significant periods of time outdoors. This assumption is likely to be conservative for firefighters in regional settings, who typically spend less time onsite
Time Spent Outdoors	hours	1	4	2	HIL D assumes a standard 8-hour working day, with minimal time spent outdoors. MFS SA has indicated that:
Time Spent Indoors	hours	8	8	1	- firefighters in metropolitan locations typically work 12-hour shifts - firefighters in regional locations typically work 3-hour shifts It has also been assumed that firefighters may spend significant amounts of time outdoors, undertaking activities such as training and equipment and facility maintenance
Lung Retention Factor	-	0.375	0.375	0.375	ASC NEPM default, as detailed in Schedule B7. Describes the percentage of dust that is small enough to be inhaled.
Particulate Emission Factor	(m ³ /kg)	3.70E+10	9.7E+09	9.7E+09	Calculated as described in Schedule B7 of the ASC NEPM. For HIL D, up to 20% of the site is assumed to be open ground. For the SA MFS fire stations up to 75% of the site is assumed to be open ground
Indoor Air Dust Factor	(m ³ /kg)	2.6E+07	2.6E+07	2.6E+07	ASC NEPM default, as described in Schedule B7. The indoor dust concentration is assumed to be equal to the 95th percentile from Australian data (enHealth 2012; 39 µg/m ³), noting that indoor air can be enriched with dust compared to the outdoor environment, due to the movement of dust indoors on clothing, footwear etc.
Fraction of indoor dust comprised of outdoor soil	-	0.5	0.5	0.5	ASC NEPM default, as described in Schedule B7. Assume 50% of indoor dust is comprised of soil tracked into the building
Body weight	kg	70	70	70	ASC NEPM default, as described in Schedule B7.
Exposure Frequency	days/year	240	140	52	HIL D assumes a 5-day working week for 48 weeks per year. MFS has indicated that - firefighters in metropolitan stations typically work four shifts every eight days - firefighters in regional stations typically work one 3-hour shift per week
Exposure Duration	years	30	30	30	ASC NEPM default, as described in Schedule B7. Note that this parameter does not influence the derived HIL for threshold chemicals, as exposure is averaged over the exposure duration.
Averaging Time (ingestion)	days	10950	10950	10950	Calculated based on the exposure duration. Multiplied by 24 hours for the assessment of inhalation exposures
Averaging Time (inhalation)	hours	262800	262800	262800	

Attachment 2

**SA MFS directive on the removal of
produce**

29 September 2022

FRUIT AND VEGETABLE GARDEN REMOVAL FROM ALL MFS STATIONS

MFS is directing all MFS stations to remove all fruit and vegetable gardens from MFS stations.

This is required to be completed by the **31st of October 2022**.

Garden waste can be disposed of as per the normal station procedures to dispose of this sort of waste. Where this is not practicable due to volume, please contact your Commander to arrange for an alternative solution, such as the provision of the high sided/skip pod.

If the fruit and vegetable garden cannot be removed by station personnel, please advise via the mfspfas@sa.gov.au. That email is to contain an audit of all fruit/vegetable trees that require removal by external contractors prior to 21 October 2022. The MFS will then arrange for these to be removed.

All fruit and vegetable gardens are required to be removed as the EPA see the presence of fruit and vegetable trees on fire stations as a possible human receptor to PFAS (even if you are not consuming the fruit and vegetables from them).

The MFS will provide ornamental plants and vegetation to replace the plants pulled out up to a value of \$100 on application. Applications from each station can be sent to mfspfas@sa.gov.au. Approval will then be forwarded to the relevant Metropolitan/Regional Commander to use their credit card to purchase the goods.

Metropolitan and Regional Commanders are to ensure that there are no fruit and vegetable gardens remaining at their relevant stations after the 31st of October 2022.

C Shift is responsible under the Station Management System - Station Administration, to ensure that this document is read, signed, placed on the Notice Board and filed.

Staff are reminded that the current SAPs, SOPs, Policies, SP Forms, Memorandums, Service Directives and Operational Procedures are available on the Members Only Website (MOW). This is a directive from the Chief Officer.

SIGNED

M. Morgan
**CHIEF OFFICER and
CHIEF EXECUTIVE**

ACTION	DATE	SIGN
Instruction received at Station		
Instruction read to "A" Shift		
Instruction read to "B" Shift		
Instruction read to "C" Shift		
Instruction read to "D" Shift		
Instruction read to Retained Staff		
Instruction read to OTR		
Placed on Notice Board		
Filed in Station File		

Attachment 3

SSHILs modelling inputs and outputs.

Derivation of Site specific health investigation levels

Firefighters at regional fire stations - South Australian Metropolitan Fire Service

Summary of Exposure Parameters			References/Notes
Soil and Dust Ingestion Rate	- Adults	IR _{SA}	mg/day
Time Spent Outdoors		ET _O	hours
Time Spent Indoors		ET _I	hours
Lung Retention Factor		RF	-
Particulate Emission Factor		PEF _O	(m ³ /kg)
Indoor Air Dust Factor		PEF _I	(m ³ /kg)
Fraction of indoor dust comprised of outdoor soil		TF	-
Body weight	- Adults	BW _c	kg
Exposure Frequency		EF	days/year
Exposure Duration	- Adults	ED _c	years
Averaging Time (non-carcinogenic)		AT _T	days
			Parameter
			50
			1
			2
			0.375
			9.7E+09
			2.6E+07
			0.5
			70
			52
			30
			ED*365
			Calculated based on ED for each relevant age group, multiplied by 24 hours for the assessment of inhalation exposures

Threshold Calculations – Adult Worker											
Compound	Toxicity Reference Value Oral (TRV _o) (mg/kg/day)	GI Absorption (GAF) (unitless)	Toxicity Reference Value Dermal (TRV _d) (mg/kg/day)	Oral Bioavailability BA _o (%)	Dermal Absorption Factor (DAF) (unitless)	Background Intake Oral/Dermal (BI _o) (% of TDI)	Toxicity Reference Value Inhalation (TRV _i) (mg/m ³)	Background Intake Inhalation (BI _i) (% of TC)	Pathway Specific HILs (mg/kg)		Derived Soil HIL (not rounded) (mg/kg)
									Soil Ingestion	Dust	
PFOS+PFHXS	0.00002	1	0.00002	100%	-	80%	0.00007	0%	3.9E+01	8.0E+05	39
PFOA	0.00016	1	0.00016	100%	-	80%	0.00056	0%	3.1E+02	6.4E+06	314
									NA	Pathway not of significance for chemical assessed	

Derivation of Site specific health investigation levels
Fire fighters at metropolitan fire stations - South Australian Metropolitan Fire Service

Summary of Exposure Parameters			References/Notes	
Soil and Dust Ingestion Rate	- Adults		Parameter	
Time Spent Outdoors	IR _{SA}	mg/day	50	Site-specific assumption: Consistent with assumption adopted for adults in residential settings
Time Spent Indoors	ET _o	hours	4	Site-specific assumption: 12-hour shifts during which 4 hours are spent outdoors.
Lung Retention Factor	ET _i	hours	8	Site-specific assumption: 12-hour shifts during which 8 hours are spent indoors.
Particulate Emission Factor	RF	-	0.375	ASC NEPM default assumption
Indoor Air Dust Factor	PEF _o	(m ³ /kg)	9.7E+09	Calculated: Based on the site-specific assumption that up to 75% of individual sites is open ground
Fraction of indoor dust comprised of outdoor soil	PEF _i	(m ³ /kg)	2.6E+07	ASC NEPM default assumption
Body weight	TF	-	0.5	ASC NEPM default
Exposure Frequency	BW _c	kg	70	ASC NEPM default
Exposure Duration	EF	days/year	146	Site-specific assumption: Four shifts every eight days (i.e., four days at work and four days off)
Averaging Time (non-carcinogenic)	ED _c	years	30	ASC NEPM default assumption
	AT _T	days	ED*365	Calculated based on ED, multiplied by 24 hours for the assessment of inhalation exposures

Threshold Calculations - Adult Worker												
Compound	Toxicity Reference Value Oral (TRV _o) (mg/kg/day)	GI Absorption (GAF) (unitless)	Toxicity Reference Value Dermal (TRV _d) (mg/kg/day)	Oral Bioavailability BA _o (%)	Dermal Absorption Factor (DAF) (unitless)	Background Intake Oral/Dermal (BL _o) (% of TDI)	Toxicity Reference Value Inhalation (TRV _i) (mg/m ³)	Background Intake Inhalation (BI _i) (% of TC)	Pathway Specific HILs (mg/kg)			Derived Soil HIL (not rounded) (mg/kg)
									Soil Ingestion	Dermal	Dust	
PFOS+PFHxS	0.00002	1	0.00002	100%	-	80%	0.00007	0%	1.4E+01	NA	7.2E+04	14
PFOA	0.00016	1	0.00016	100%	-	80%	0.00056	0%	1.1E+02	NA	5.7E+05	112
NA												

Appendix F

Borelogs

Appendix B – Photo Log

Description	Photograph
Photo 1: BH01	
Photo 2: BH02	

Description	Photograph
Photo 3: BH03	
Photo 4: BH04	

Description	Photograph
Photo 5: BH05	
Photo 6: BH06	

Description	Photograph
Photo 7: BH07	
Photo 8: BH08	

Description	Photograph
Photo 9: Concrete core hole	
Photo 10: Concrete core	

Description	Photograph
Photo 11: MW01	
Photo 12: MW02	

Description	Photograph
Photo 13: MW03	



BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH01

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -35.0084104947746
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.540182551369
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 5.00	Elevation
Location 65 Morphett Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
0.2	DC					OTHER			PAVER	-0.2
0.4	HA					Sandy GRAVEL fine to medium, poorly graded, subangular, brown- grey, fine to medium, poorly graded sand (FILL)	M	L		-0.4
0.6	PT		BH01_0.4-0.5			SAND fine to medium, poorly graded, orange- brown (FILL)	SM	L		-0.6
0.8						SAND fine to medium, poorly graded, brown- grey (FILL)	SM	L		-0.8
1.0										-1.0
1.2										-1.2
1.4						Sandy CLAY low to medium plasticity, white- grey, fine to medium, poorly graded sand (NATURAL - SOIL)	M	S		-1.4
1.6										-1.6
1.8			BH01_1.7-1.8							-1.8
2.0						Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	M	F		-2.0
2.2										-2.2
2.4										-2.4
2.6										-2.6
2.8			BH01_2.7-2.8							-2.8
3.0										-3.0
3.2										-3.2
3.4										-3.4
3.6										-3.6
3.8										-3.8
4.0										-4.0
4.2										-4.2
4.4										-4.4
4.6										-4.6
4.8										-4.8
5.0						Termination Depth at: 5.00 m. Target depth achieved.				-5.0
5.2										-5.2

Notes			
This log is not intended for geotechnical purposes.			
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, 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

SOIL BORE BH02

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9663112545386
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537676529959
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 5.00	Elevation
Location 65 Morphett Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
0.2	DC		BH02_PAVER			OTHER			PAVER	
	HA		BH02_0.08-0.18			Sandy GRAVEL fine to medium, poorly graded, subangular, grey- brown, fine to medium, poorly graded sand (FILL)	SM	L		-0.2
0.4	PT									-0.4
			BH02_0.4-0.5			SAND fine to medium, poorly graded, orange- brown with black (FILL)	SM	L	Black, carbon type	-0.6
0.6						SAND fine to medium, poorly graded, pale brown- tan (FILL)	SM	L		-0.8
0.8										-1
1						SAND fine to medium, poorly graded, dark brown with black (FILL)	M	L		-1.2
1.2						SAND fine to medium, poorly graded, white- tan with orange- brown (NATURAL - SOIL)	VM	L		-1.4
1.4										-1.6
1.6										-1.8
1.8						Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-2
2										-2.2
2.2										-2.4
2.4										-2.6
2.6			BH02_2.5-2.6							-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
4.2										-4.4
4.4										-4.6
4.6										-4.8
4.8										-5
5						Termination Depth at: 5.00 m. Target depth achieved.				-5.2
5.2										

Notes

This log is not intended for geotechnical purposes.

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, 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

SOIL BORE BH03

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.966349392198
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537577539682
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 5.00	Elevation
Location 65 Morphett Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
0.2	DC		BH03_0.08-0.18 (FD01,FS01)			OTHER			PAVER	-0.2
0.4	HA					Sandy GRAVEL fine to medium, poorly graded, subangular, brown- grey, fine to medium, poorly graded sand (FILL)	SM	L		-0.4
0.6	PT					Gravelly SAND fine to medium, poorly graded, orange-brown with tan, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.6
0.8			BH03_0.75-0.85			SAND fine to medium, poorly graded, orange- brown (FILL)	SM	L		-0.8
1.0						SAND fine to medium, poorly graded, dark grey (NATURAL - SOIL)	M	L		-1.0
1.2						Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	ST		-1.2
1.4										-1.4
1.6										-1.6
1.8										-1.8
2.0										-2.0
2.2										-2.2
2.4										-2.4
2.6			BH03_2.6-2.7							-2.6
2.8										-2.8
3.0										-3.0
3.2										-3.2
3.4										-3.4
3.6			BH03_3.6-3.7							-3.6
3.8										-3.8
4.0										-4.0
4.2										-4.2
4.4										-4.4
4.6										-4.6
4.8										-4.8
5.0						Termination Depth at: 5.00 m. Target depth achieved.				-5.0
5.2										-5.2

Notes

This log is not intended for geotechnical purposes.

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, 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

SOIL BORE BH04

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9665059242398
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.5376124084
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 4.00	Elevation
Location 65 Morphet Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
	DC					OTHER			PAVER	
0.2	HA		BH04_0.08-0.18			Gravelly SAND fine to medium, poorly graded, pale grey, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.2
0.4	PT					SAND fine to medium, poorly graded, orange- brown (FILL)	SM	L		-0.4
0.6										-0.6
0.8			BH04_0.65-0.75			SAND fine to medium, poorly graded, pale brown- tan (NATURAL - SOIL)	M	L		-0.8
1										-1
1.2										-1.2
1.4										-1.4
1.6										-1.6
1.8						SAND fine to medium, poorly graded, black- brown (NATURAL - SOIL)	M	L		-1.8
2										-2
2.2			BH04_2.1-2.2			Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-2.2
2.4										-2.4
2.6										-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						Termination Depth at: 4.00 m. Borehole collapse.				-4

Notes

This log is not intended for geotechnical purposes.

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, 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

SOIL BORE BH05

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9665874801576
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537732018158
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 3.00	Elevation
Location 65 Morphett Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
	DC		BH05_PAVER			OTHER			PAVER	
0.2	HA		BH05_0.08-0.18			Gravelly SAND fine to medium, poorly graded, pale grey, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.2
0.4	PT		BH05_0.4-0.5			SAND fine to medium, poorly graded, pale brown, trace brick fragments (FILL)	SM	L		-0.4
0.6						SAND fine to medium, poorly graded, pale brown- tan (NATURAL - SOIL)	M	L		-0.6
0.8										-0.8
1										-1
1.2						Sandy CLAY low to medium plasticity, pale grey mottled orange- brown, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-1.2
1.4										-1.4
1.6										-1.6
1.8										-1.8
2			BH05_2.0-2.1							-2
2.2										-2.2
2.4										-2.4
2.6										-2.6
2.8										-2.8
3						Termination Depth at: 3.00 m. Borehole collapse.				-3

Notes

This log is not intended for geotechnical purposes.

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, 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

SOIL BORE BH06

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9665843369439
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537516687065
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 3.00	Elevation
Location 65 Morphett Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
	DC					OTHER			PAVER	
0.2	HA		BH06_0.08-0.18 (FD02,FS02)			Gravelly SAND fine to medium, poorly graded, pale grey, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.2
0.4	PT					Gravelly SAND fine to medium, poorly graded, pale grey- brown, fine to coarse sand, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.4
0.6			BH06_0.6-0.7			SAND fine to medium, poorly graded, grey- brown (FILL)	SM	L		-0.6
0.8						SAND fine to medium, poorly graded, tan (NATURAL - SOIL)	M			-0.8
1.0										-1.0
1.2										-1.2
1.4						SAND fine to medium, poorly graded, dark brown with grey (NATURAL - SOIL)	SM	L		-1.4
1.6						Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-1.6
1.8										-1.8
2.0										-2.0
2.2										-2.2
2.4			BH06_2.4-2.5							-2.4
2.6										-2.6
2.8										-2.8
3.0						Termination Depth at: 3.00 m. Borehole collapse.				-3.0

Notes

This log is not intended for geotechnical purposes.

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, 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

SOIL BORE BH07

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9665858456865
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537395652384
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 3.00	Elevation
Location 65 Morphett Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
	DC		BH07_PAVER			OTHER			PAVER	
0.2	HA		BH07_0.08-0.18			Gravelly SAND fine to medium, poorly graded, pale grey, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.2
0.4	PT									-0.4
0.6						SAND fine to medium, poorly graded, dark brown (FILL)	SM	L		-0.6
0.8			BH07_0.65-0.75			SAND fine to medium, poorly graded, pale brown- tan (NATURAL - SOIL)	M	L		-0.8
1.0										-1.0
1.2						SAND fine to medium, poorly graded, dark brown (NATURAL - SOIL)	M	L		-1.2
1.4						Sandy CLAY low to medium plasticity, orange- brown mottled pale grey (NATURAL - SOIL)	SM	F		-1.4
1.6										-1.6
1.8										-1.8
2.0										-2.0
2.2										-2.2
2.4										-2.4
2.6										-2.6
2.8										-2.8
3.0			BH07_2.9-3.0							-3.0
3.0						Termination Depth at: 3.00 m. Borehole collapse.				-3.0

Notes

This log is not intended for geotechnical purposes.

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, 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

SOIL BORE BH08

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9665975803509
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537405878305
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Total Depth (m) 4.00	Elevation
Location 65 Morphett Rd	Diameter (mm) 50	Logged By TW
Date Drilled 16/10/2023		Checked By AR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	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)
	DC					OTHER			PAVER	
0.2	HA		BH08_0.08-0.18 (FD03,FS03)			Gravelly SAND fine to medium, poorly graded, pale grey, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.2
0.4	PT									-0.4
0.6			BH08_0.55-0.65			SAND fine to medium, poorly graded, dark brown (FILL)	SM	L		-0.6
0.8						SAND fine to medium, poorly graded, pale brown- tan (NATURAL - SOIL)	SM	L		-0.8
1.0						SAND fine to medium, poorly graded, dark brown (NATURAL - SOIL)	SM	L		-1.0
1.2										-1.2
1.4						Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-1.4
1.6										-1.6
1.8										-1.8
2.0										-2.0
2.2			BH08_2.2-2.3							-2.2
2.4										-2.4
2.6										-2.6
2.8										-2.8
3.0										-3.0
3.2										-3.2
3.4										-3.4
3.6										-3.6
3.8										-3.8
4.0						Termination Depth at: 4.00 m. Borehole collapse.				-4.0

Notes

This log is not intended for geotechnical purposes.

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, 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

MONITORING WELL MW01

ENVIRONMENTAL-GROUNDWATER

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9664586922154
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537702262402
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Drill Method	Elevation
Location 65 Morphett Rd	Total Depth (m) 3.50	Logged By TW
Date Drilled 17/10/2023	Casing Diameter (mm) 50	Checked By AR

B.C.L No. 449012 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)
0.2	DC		MW01_CONCRETE (FD05, FS05)		Concrete		CONCRETE				-0.2
0.4	PT		MW01_0.25-0.35 (FD04 FS04)		Bentonite		Gravelly SAND fine to medium, poorly graded, dark grey- brown, angular to subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.4
0.6			MW01_0.4-0.5				SAND fine, poorly graded, tan- brown and brown- grey (NATURAL - SOIL)	M	L		-0.6
0.8											-0.8
1											-1
1.2											-1.2
1.4											-1.4
1.6							Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-1.6
1.8											-1.8
2					Gravel Pack						-2
2.2											-2.2
2.4			MW01_2.4-2.5								-2.4
2.6											-2.6
2.8											-2.8
3	SFA										-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

MONITORING WELL MW02

ENVIRONMENTAL-GROUNDWATER

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude -34.9665982928127
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude 138.537308396772
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Drill Method	Elevation
Location 65 Morphett Rd	Total Depth (m) 4.00	Logged By TW
Date Drilled 17/10/2023	Casing Diameter (mm) 50	Checked By AR

B.C.L No. 449011 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)
0.2	DC						OTHER			PAVER	
0.2	HA		MW02_0.08-0.18		Concrete		Gravelly SAND fine to medium, poorly graded, pale grey, subangular, fine to medium, poorly graded gravel (FILL)	SM	L		-0.2
0.4	PT		MW02_0.4-0.5		Bentonite		SAND fine to medium, poorly graded, pale yellow (FILL)	SM	L		-0.4
0.6							SAND fine to medium, poorly graded, dark brown with tan (NATURAL - SOIL)	VM	L		-0.6
0.8											-0.8
1.0											-1.0
1.2											-1.2
1.4							Sandy CLAY low to medium plasticity, orange- brown mottled pale grey, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-1.4
1.6											-1.6
1.8											-1.8
2.0											-2.0
2.2											-2.2
2.4					Gravel Pack						-2.4
2.6											-2.6
2.8											-2.8
3.0	SFA										-3.0
3.2											-3.2
3.4			MW02_3.3-3.4								-3.4
3.6											-3.6
3.8											-3.8
4.0							Termination Depth at: 4.00 m. Target depth achieved.				-4.0

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

MONITORING WELL MW03

ENVIRONMENTAL-GROUNDWATER

Page 1 of 1

Client MFS	Drill Co. WB Drilling Pty. Ltd.	Latitude
Project MFS Camden Park DSI	Driller WB Drilling Pty. Ltd.	Longitude
Project No. 12616802	Rig Type Eziprobe	Grid Ref GDA94_MGA_zone_54
Site MFS Camden Park	Drill Method	Elevation
Location 65 Morphett Rd	Total Depth (m) 3.50	Logged By TW
Date Drilled 17/10/2023	Casing Diameter (mm) 50	Checked By AR

B.C.L No. 449013 **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)
0.2	HA		MW03_0.01-0.1		Concrete		GRASS	SM	L		-0.2
0.4	PT		MW03_0.4-0.5		Bentonite		Silty SAND fine to medium, poorly graded, dark brown, trace rootlets (Reworked NATURAL)	SM	L		-0.4
0.6							Silty SAND fine to medium, poorly graded, dark brown, some brick fragments (FILL)	SM	VL		-0.6
0.8							Gravelly SAND fine to medium, poorly graded, orange- brown, angular to subangular, fine to coarse, poorly graded gravel (FILL)	SM	VL		-0.8
1.0											-1.0
1.2											-1.2
1.4							Sandy CLAY low plasticity, dark brown, fine to medium, poorly graded sand (Reworked NATURAL)	SM	F		-1.4
1.6							SAND fine to medium, poorly graded, tan- grey (NATURAL - SOIL)	M	L		-1.6
1.8											-1.8
2.0					Gravel Pack						-2.0
2.2							Sandy CLAY low to medium plasticity, orange- brown, fine to medium, poorly graded sand (NATURAL - SOIL)	SM	F		-2.2
2.4											-2.4
2.6											-2.6
2.8											-2.8
3.0	SFA		MW03_2.9-3.0								-3.0
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

Appendix G

Laboratory Reports

CLIENT: GHD		TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date:)				FOR LABORATORY USE ONLY (Circle)					
OFFICE: Adelaide		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date:)				Custody Seal Intact? Yes No N/A					
PROJECT: MFS CAMDEN PARK DSI		ORDER NO.: 12616802		COC SEQUENCE NUMBER (Circle)		Free ice / frozen ice bricks present upon receipt? Yes No N/A					
PROJECT MANAGER: Angus Robinson		CONTACT PH: 0431 177 498		COC: 1 2 3 4 5 6 7		Random Sample Temperature on Receipt: °C					
PROJECT MANAGER: Angus Robinson		CONTACT PH: 0431 177 498		OF: 1 2 3 4 5 6 7		Other comment:					
SAMPLER: TW (Terrence Wilson)		SAMPLER MOBILE: 0467 034 756		RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
COC emailed to ALS? YES		EDD FORMAT (or default): Esdat		Terrence Wilson		Kieren Burns					
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com		DATE/TIME: 17 October 2023; 15:00		DATE/TIME: 17 October 2023; 15:00		DATE/TIME:		DATE/TIME:			
Email Invoice to: Angus.Robinson@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 <i>(refer to codes below)</i>	TOTAL CONTAINERS	PFAS (Long Suite) - Standard LOR	HOLD								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
Borehole 1															
	BH01_0.4-0.5	16/10/2023	S	P	1	x									
	BH01_0.65-0.75	16/10/2023	S	P	1		x								
	BH01_1.15-1.25	16/10/2023	S	P	1		x								
	BH01_1.7-1.8	16/10/2023	S	P	1	x									
	BH01_2.7-2.8	16/10/2023	S	P	1	x									
	BH01_3.7-3.8	16/10/2023	S	P	1		x								
	BH01_4.8-5.0	16/10/2023	S	P	1		x								
Borehole 2															
	BH02_PAVAR	16/10/2023	S	P	1	x									
	BH02_0.08-0.18	16/10/2023	S	P	1	x									
	BH02_0.4-0.5	16/10/2023	S	P	1	x									
	BH02_0.5-0.6	16/10/2023	S	P	1		x								
	BH02_0.75-0.85	16/10/2023	S	P	1		x								
	BH02_1.0-1.1	16/10/2023	S	P	1		x								
	BH02_1.5-1.6	16/10/2023	S	P	1		x								
	BH02_2.5-2.6	16/10/2023	S	P	1	x									
	BH02_3.5-3.6	16/10/2023	S	P	1		x								
	BH02_4.9-5.0	16/10/2023	S	P	1		x								
TOTAL					17										

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
Y = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AY = 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.



COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

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.

 CHAIN OF CUSTODY ALS Laboratory: please tick →																									
CLIENT: GHD				TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date): (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) Custody Seal Intact? Yes No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comment:											
OFFICE: Adelaide				ALS QUOTE: EM23GHDSE0022						COC SEQUENCE NUMBER (Circle)															
PROJECT: MFS CAMDEN PARK DSI				ORDER NO.: 12616802						COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7															
PROJECT MANAGER: Angus Robinson				CONTACT PH: 0431 177 498																					
SAMPLER: TW (Terrence Wilson)				SAMPLER MOBILE: 0467 034 756						RELINQUISHED BY: Terrence Wilson DATE/TIME: 17 October 2023; 15:00				RECEIVED BY: Kieren Burns DATE/TIME: 17 October 2023; 15:00				RELINQUISHED BY: DATE/TIME:				RECEIVED BY: DATE/TIME:			
COC emailed to ALS? YES				EDD FORMAT (or default): Esdat																					
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; GHDLabReports@ghd.com																									
Email Invoice to: Angus.Robinson@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 (Long Suite) - Standard LOR	HOLD										Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.								
Borehole 5																									
	BH05_PAVR	16/10/2023	S	P	1	x																			
	BH05_0.08-0.18		S	P	1	x																			
	BH05_0.2-0.3		S	P	1																				
	BH05_0.4-0.5		S	P	1	x																			
	BH05_1.0-1.15		S	P	1																				
	BH05_2.0-2.1		S	P	1	x																			
	BH05_2.9-3.0		S	P	1																				
Borehole 6																									
	BH06_PAVR	16/10/2023	S	P	1		x																		
	BH06_0.08-0.18	16/10/2023	S	P	1	x																			
	BH06_0.3-0.4	16/10/2023	S	P	1		x																		
	BH06_0.4-0.5	16/10/2023	S	P	1		x																		
	BH06_0.6-0.7	16/10/2023	S	P	1	x																			
	BH06_1.2-1.3	16/10/2023	S	P	1		x																		
	BH06_1.4-1.5	16/10/2023	S	P	1		x																		
	BH06_2.4-2.5	16/10/2023	S	P	1		x																		
	BH06_2.9-3.0	16/10/2023	S	P	1	x																			
TOTAL					16																				
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.																									

CLIENT: GHD		TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date:):				FOR LABORATORY USE ONLY (Circle)					
OFFICE: Adelaide		(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date:):				Custody Seal Intact? Yes No N/A					
ALS QUOTE: EM23GHDSE0022		COC SEQUENCE NUMBER (Circle)				Free ice / frozen ice bricks present upon receipt? Yes No N/A					
PROJECT: MFS CAMDEN PARK DSI		ORDER NO.: 12616802				Random Sample Temperature on Receipt: °C					
PROJECT MANAGER: Angus Robinson		CONTACT PH: 0431 177 498				Other comment:					
SAMPLER: TW (Terrence Wilson)		SAMPLER MOBILE: 0467 034 756		RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
COC emailed to ALS? YES		EDD FORMAT (or default): Esdat		Terrence Wilson		Kieren Burns					
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; GHDLabReports@ghd.com				DATE/TIME: 17 October 2023; 15:00		DATE/TIME: 17 October 2023; 15:00		DATE/TIME:		DATE/TIME:	
Email Invoice to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@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 <i>(refer to codes below)</i>	TOTAL CONTAINERS	PFAS (Long Suite) - Standard LOR	HOLD								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
Borehole 7															
	BH07_PAVER	16/10/2023	S	P	1	x									
	BH07_0.08-0.18	16/10/2023	S	P	1	x									
	BH07_0.65-0.75	16/10/2023	S	P	1	x									
	BH07_1.0-1.1	16/10/2023	S	P	1		x								
	BH07_1.2-1.3	16/10/2023	S	P	1		x								
	BH07_1.9-2.0	16/10/2023	S	P	1		x								
	BH07_2.9-3.0	16/10/2023	S	P	1	x									
Borehole 8															
	BH08_PAVER	16/10/2023	S	P	1		x								
	BH08_0.08-0.18	16/10/2023	S	P	1	x									
	BH08_0.4-0.5	16/10/2023	S	P	1		x								
	BH08_0.55-0.65	16/10/2023	S	P	1	x									
	BH08_0.75-0.85	16/10/2023	S	P	1		x								
	BH08_1.2-1.3	16/10/2023	S	P	1		x								
	BH08_2.2-2.3	16/10/2023	S	P	1	x									
	BH08_3.2-3.3	16/10/2023	S	P	1		x								
	BH08_3.9-4.0	16/10/2023	S	P	1		x								
					TOTAL	16									

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 Disulphate 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.



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

CLIENT: GHD		TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date): (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: EM23GHDSE0022		Custody Seal Intact? Yes No N/A	
PROJECT: MFS CAMDEN PARK DSI		ORDER NO.: 12616802		Free ice / frozen ice bricks present upon receipt? Yes No N/A	
PROJECT MANAGER: Angus Robinson		CONTACT PH: 0431 177 498		Random Sample Temperature on Receipt: °C	
SAMPLER: TW (Terrence Wilson)		SAMPLER MOBILE: 0467 034 756		Other comment:	
COC emailed to ALS? YES		EDD FORMAT (or default): Esdar		RECEIVED BY: Kieren Burns	
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com		RELINQUISHED BY: Terrence Wilson		DATE/TIME: 17 October 2023; 15:00	
Email Invoice to: Angus.Robinson@ghd.com; accountspayableAU@ghd.com		DATE/TIME: 17 October 2023; 15:00		DATE/TIME:	

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 (Long Suite) - Standard LOR	HOLD									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
MW01																
	MW01_CONCRETE	17/10/2023	S	P	1	x										
	MW01_0.25-0.35	17/10/2023	S	P	1	x										
	MW01_0.4-0.5	17/10/2023	S	P	1	x										
	MW01_0.9-1.0	17/10/2023	S	P	1		x									
	MW01_1.4-1.5	17/10/2023	S	P	1		x									
	MW01_2.4-2.5	17/10/2023	S	P	1	x										
	MW01_3.4-3.5	17/10/2023	S	P	1		x									
MW02																
	MW02_PAVAR	17/10/2023	S	P	1											
	MW02_0.08-0.18	17/10/2023	S	P	1	x										
	MW02_04.-0.5	17/10/2023	S	P	1	x										
	MW02_0.65-0.75	17/10/2023	S	P	1		x									
	MW02_1.3-1.4	17/10/2023	S	P	1		x									
	MW02_2.3-2.4	17/10/2023	S	P	1		x									
	MW02_3.3-3.4	17/10/2023	S	P	1	x										
	MW02_3.9-4.0	17/10/2023	S	P	1		x									
TOTAL					15											

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.

 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 (List due date): ☐ Non Standard or urgent TAT (List due date):							FOR LABORATORY USE ONLY (Circle)			
OFFICE: Adelaide				ALS QUOTE: EM23GHDSE0022							COC SEQUENCE NUMBER (Circle)			
PROJECT: MFS CAMDEN PARK DSI				ORDER NO.: 12616802							COC: 1 2 3 4 5 6 7			
PROJECT MANAGER: Angus Robinson				CONTACT PH: 0431 177 498							OF: 1 2 3 4 5 6 7			
SAMPLER: TW (Terrence Wilson)				SAMPLER MOBILE: 0467 034 756							RELINQUISHED BY:			
COC emailed to ALS? YES				EDD FORMAT (or default): Esdat							Terrence Wilson			
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com				DATE/TIME: 17 October 2023; 15:00							RECEIVED BY:			
Email Invoice to: Angus.Robinson@ghd.com; accountspayableAU@ghd.com											Kieren Burns			
											DATE/TIME: 17 October 2023; 15:00			
											DATE/TIME:			
											DATE/TIME:			
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 (Long Suite) - Standard LOR	HOLD							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
MW03														
	MW03_0.01-0.1	17/10/2023	S	P	1	x								
	MW03_0.15-0.2	17/10/2023	S	P	1		x							
	MW03_0.4-0.5	17/10/2023	S	P	1	x								
	MW03_1.3-1.4	17/10/2023	S	P	1		x							
	MW03_2.0-2.1	17/10/2023	S	P	1		x							
	MW03_2.9-3.0	17/10/2023	S	P	1	x								
	MW03_3.4-3.5	17/10/2023	S	P	1		x							
TOTAL					7			#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	
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.														

 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 (List due date): ☐ 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: °C Other comment:		
OFFICE: Adelaide														
PROJECT: MFS CAMDEN PARK DSI				ORDER NO.: 12616802				COC SEQUENCE NUMBER (Circle)						
PROJECT MANAGER: Angus Robinson				CONTACT PH: 0431 177 498				COC: 1 2 3 4 5 6 7						
PROJECT MANAGER: Angus Robinson				CONTACT PH: 0431 177 498				OF: 1 2 3 4 5 6 7						
SAMPLER: TW (Terrence Wilson)				SAMPLER MOBILE: 0467 034 756				RELINQUISHED BY:			RECEIVED BY:			
COC emailed to ALS? YES				EDD FORMAT (or default): Esdat				Terrence Wilson			Kieren Burns			
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com				DATE/TIME: 17 October 2023; 15:00				DATE/TIME: 17 October 2023; 15:00			DATE/TIME:			
Email Invoice to: Angus.Robinson@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 (Long Suite) - Standard LOR	HOLD							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	FD01 (intralab)	16/10/2023	S	P	1	x								
	FS01 (interlab)	16/10/2023	S	P	1	x	*Please forward to Eurofins*							
	FD02 (intralab)	16/10/2023	S	P	1	x								
	FS02 (interlab)	16/10/2023	S	P	1	x	*Please forward to Eurofins*							
	FD03 (intralab)	16/10/2023	S	P	1	x								
	FS03 (interlab)	16/10/2023	S	P	1	x								
	FB01	16/10/2023	W	P	1		x							
	RB01	16/10/2023	W	P	1	x								
	FD04 (intralab)	17/10/2023	S	P	1	x								
	FS04 (interlab)	17/10/2023	S	P	1	x	*Please forward to Eurofins*							
	FD05 (intralab)	17/10/2023	S	P	1	x								
	FS05 (interlab)	17/10/2023	S	P	1	x	*Please forward to Eurofins*							
TOTAL					12									
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.														



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 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.



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

257

CLIENT: GHD	TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: Adelaide	(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: MFS CAMDEN PARK DSI	ALS QUOTE: EM23GHDSE0022	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT MANAGER: Angus Robinson	ORDER NO.: 12616802	Random Sample Temperature on Receipt: °C
SAMPLER: TW (Terrence Wilson)	CONTACT PH: 0431 177 498	Other comment:
COC emailed to ALS? YES	SAMPLER MOBILE: 0467 034 756	RECEIVED BY: Kieren Burns
EDD FORMAT (or default): Esdat	RELINQUISHED BY: Terrence Wilson	RECEIVED BY: SR (ALS)
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com	DATE/TIME: 17 October 2023; 15:00	DATE/TIME: 19/10/23
Email Invoice to: Angus.Robinson@ghd.com; accountspayableAU@ghd.com	DATE/TIME: 17 October 2023; 15:00	DATE/TIME: 20/10/23 9am

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Carrier Ice 7.40°

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 (Long Suite) - Standard LOR	HOLD							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
90	FD01 (Intralab)	16/10/2023	S	P	1	x								
—	FS01 (interlab)	16/10/2023	S	P	1	x								*Please forward to Eurofins*
91	FD02 (Intralab)	16/10/2023	S	P	1	x								
—	FS02 (interlab)	16/10/2023	S	P	1	x								*Please forward to Eurofins*
92	FD03 (Intralab)	16/10/2023	S	P	1	x								
93	FS03 (interlab)	16/10/2023	S	P	1	x								
94	FB01	16/10/2023	W	P	1		x							
95	RB01	16/10/2023	W	P	1	x								
96	FD04 (Intralab)	17/10/2023	S	P	1	x								
—	FS04 (interlab)	17/10/2023	S	P	1	x								*Please forward to Eurofins*
97	FD05 (Intralab)	17/10/2023	S	P	1	x								
—	FS05 (interlab)	17/10/2023	S	P	1	x								*Please forward to Eurofins*
					12									

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.

SAMPLES RECEIVED WITHOUT COC

CLIENT: GHD	CARRIER: STARTRACK
PROJECT / QUOTE: 12616802	CONNOTE #: 3 ZIZ 50000 459
CONTACT NAME:	AWB #:
CONTACT NUMBER:	# OF ESKIES: 3 eskies SECURITY SEAL: (Y) N N/A
SAMPLER NAME: TW	TYPE OF ESKIES:
SAMPLER NUMBER:	ESKY NUMBERS:
SAMPLES RECEIVED BY: BL (ALS)	# OF SAMPLES:
DATE/TIME RECEIVED: 18/10/2023 CLIENT SERVICES NOTIFIED BY:	TEMPERATURE: 9.0°C

Environmental Division
Melbourne
Work Order Reference
EM2318553



telephone : + 61-3-6549 9600

LAB ID	SAMPLE DETAILS				NUMBER OF CONTAINERS	ADDITIONAL INFORMATION / COMMENTS:
	SAMPLE ID	DATE	MATRIX	OTHER INFORMATION:		
1	BH02 - 49-5.0	16/10/23	S	1	☐ MICRO ☐ BIOSECURITY ☐ BROKEN CONTAINERS ☐ COC EMAILED ☐ ALS COMPASS PFAS FREIGHT	
2	BH02 - 2.5 - 2.6	"	"	"		
3	RB02	17/10/23	W	1		
4	MW01 - 0.9 - 1.0	"	S	1		
5						
TOTAL						

CORRESPONDENCE (DATE, INITIALS - DETAILS OF CORRESPONDENCE):



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 (List due date): ☐ Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Adelaide	ALS QUOTE: EM23GHDSE0022	COC SEQUENCE NUMBER (Circle)	Custody Seal Intact?	Yes No N/A
PROJECT: MFS CAMDEN PARK DSI	ORDER NO.: 12616802	COC: 1 2 3 4 5 6 7	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
PROJECT MANAGER: Angus Robinson	CONTACT PH: 0431 177 498	OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt:	°C
SAMPLER: TW (Terrence Wilson)	SAMPLER MOBILE: 0467 034 756	RELINQUISHED BY: Terrence Wilson	RECEIVED BY: Kieren Burns	RECEIVED BY:
COC emailed to ALS? YES	EDD FORMAT (or default): Esdat	DATE/TIME: 17 October 2023; 15:00	DATE/TIME: 17 October 2023; 15:00	DATE/TIME:
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrow@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com				
Email Invoice to: Angus.Robinson@ghd.com; accounts payableAU@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 (Long Suite) - Standard LOR	HOLD									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
Borehole 1																
1	BH01_0.4-0.5	16/10/2023	S	P	1	x										
2	BH01_0.65-0.75	16/10/2023	S	P	1		x									
3	BH01_1.15-1.25	16/10/2023	S	P	1		x									
4	BH01_1.7-1.8	16/10/2023	S	P	1	x										
5	BH01_2.7-2.8	16/10/2023	S	P	1	x										
6	BH01_3.7-3.8	16/10/2023	S	P	1		x									
7	BH01_4.8-5.0	16/10/2023	S	P	1		x									
Borehole 2																
8	BH02_PAVAR	16/10/2023	S	P	1	x										
9	BH02_0.08-0.18	16/10/2023	S	P	1	x										
10	BH02_0.4-0.5	16/10/2023	S	P	1	x										
11	BH02_0.5-0.6	16/10/2023	S	P	1		x									
12	BH02_0.75-0.85	16/10/2023	S	P	1		x									
13	BH02_1.0-1.1	16/10/2023	S	P	1		x									
14	BH02_1.5-1.6	16/10/2023	S	P	1		x									
15	BH02_2.5-2.6	16/10/2023	S	P	1	x										
16	BH02_3.5-3.6	16/10/2023	S	P	1		x									
17	BH02_4.9-5.0	16/10/2023	S	P	1		x									
TOTAL					17											

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 Special 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.



CHAIN OF CUSTODY

ALS Laboratory
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CLIENT: GHD OFFICE: Adelaide	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics) ALS QUOTE: EM23GHDSE0022 ORDER NO.: 12616802	☒ Standard TAT (List due date): ☐ 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: °C Other comment:	
PROJECT: MFS CAMDEN PARK DSI	CONTACT PH: 0431 177 498	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7		
PROJECT MANAGER: Angus Robinson	SAMPLER: TW (Terrence Wilson)	SAMPLER MOBILE: 0467 034 756	RELINQUISHED BY: Terrence Wilson	RECEIVED BY: Kieren Burns
COC emailed to ALS? YES	EDD FORMAT (or default): Esdat	DATE/TIME: 17 October 2023; 15:00	DATE/TIME: 17 October 2023; 15:00	DATE/TIME:
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; EloiseIvy.Garcia@ghd.com; GHDLabReports@ghd.com Email Invoice to: Angus.Robinson@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 <i>(refer to codes below)</i>	TOTAL CONTAINERS	PFAS (Long Suite) - Standard LOR	HOLD									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
Borehole 3																
18	BH03_PAVAR	16/10/2023	S	P	1		X									
19	BH03_0.08-0.18	16/10/2023	S	P	1	X										
20	BH03_0.3-0.4	16/10/2023	S	P	1		X									
21	BH03_0.75-0.85	16/10/2023	S	P	1	X										
22	BH03_1.4-1.5	16/10/2023	S	P	1		X									
23	BH03_1.6-1.7	16/10/2023	S	P	1		X									
24	BH03_2.6-2.7	16/10/2023	S	P	1	X										
25	BH03_3.6-3.7	16/10/2023	S	P	1	X										
26	BH03_4.8-5.0	16/10/2023	S	P	1		X									
Borehole 4																
27	BH04_PAVAR	16/10/2023	S	P	1		X									
28	BH04_0.08-0.18	16/10/2023	S	P	1	X										
29	BH04_0.3-0.4	16/10/2023	S	P	1		X									
30	BH04_0.65-0.75	16/10/2023	S	P	1	X										
31	BH04_1.2-1.3	16/10/2023	S	P	1		X									
32	BH04_1.7-1.8	16/10/2023	S	P	1		X									
33	BH04_2.1-2.2	16/10/2023	S	P	1	X										
34	BH04_3.1-3.2	16/10/2023	S	P	1		X									
35	BH04_3.9-4.0	16/10/2023	S	P	1		X									
TOTAL					18											

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; VS = VOA Vial Sodium Bisulphate 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.



CHAIN OF CUSTODY

ALS Laboratory:
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CLIENT: GHD	TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Adelaide	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A	
PROJECT: MFS CAMDEN PARK DSI	ALS QUOTE: EM23GHDSE0022	Free Ice / frozen ice bricks present upon receipt? Yes No N/A	
PROJECT MANAGER: Angus Robinson	ORDER NO.: 12616802	Random Sample Temperature on Receipt: °C	
SAMPLER: TW (Terrence Wilson)	SAMPLER MOBILE: 0467 034 756	Other comment:	
COC emailed to ALS? YES	EDD FORMAT (or default): Esdat	RELINQUISHED BY:	RECEIVED BY:
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; GHD.LabReports@ghd.com	Terrence Wilson	Kieren Burns	
Email Invoice to: Angus.Robinson@ghd.com; accountspayableAU@ghd.com	DATE/TIME: 17 October 2023; 15:00	DATE/TIME: 17 October 2023; 15:00	DATE/TIME:

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 (Long Suite) - Standard LOR	HOLD									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
Borehole 5																
36	BH05_PAVAR	16/10/2023	S	P	1	x										
37	BH05_0.08-0.18		S	P	1											
38	BH05_0.2-0.3		S	P	1											
39	BH05_0.4-0.5		S	P	1											
40	BH05_1.0-1.15		S	P	1											
41	BH05_2.0-2.1		S	P	1											
42	BH05_2.9-3.0		S	P	1											
Borehole 6																
43	BH06_PAVAR	16/10/2023	S	P	1		x									
44	BH06_0.08-0.18	16/10/2023	S	P	1	x										
45	BH06_0.3-0.4	16/10/2023	S	P	1		x									
46	BH06_0.4-0.5	16/10/2023	S	P	1		x									
47	BH06_0.6-0.7	16/10/2023	S	P	1	x										
48	BH06_1.2-1.3	16/10/2023	S	P	1		x									
49	BH06_1.4-1.5	16/10/2023	S	P	1		x									
50	BH06_2.4-2.5	16/10/2023	S	P	1		x									
51	BH06_2.9-3.0	16/10/2023	S	P	1	x										
TOTAL					16											

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 Bisulfate 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.



CHAIN OF CUSTODY

ALS Laboratory
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CLIENT: GHD	TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Adelaide	(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) ☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A	
PROJECT: MFS CAMDEN PARK DSI	ALS QUOTE: EM23GHDSE0022	Free ice / frozen ice bricks present upon receipt? Yes No N/A	
PROJECT MANAGER: Angus Robinson	ORDER NO.: 12616802	Random Sample Temperature on Receipt: °C	
SAMPLER: TW (Terrence Wilson)	SAMPLER MOBILE: 0467 034 756	Other comment:	
COC emailed to ALS? YES	EDD FORMAT (or default): Esdat	RECEIVED BY: Kieren Burns	RECEIVED BY:
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; GHDLabReports@ghd.com	RELINQUISHED BY: Terrence Wilson	DATE/TIME: 17 October 2023; 15:00	DATE/TIME:
Email Invoice to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com	DATE/TIME: 17 October 2023; 15:00	DATE/TIME:	DATE/TIME:

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 <i>(refer to codes below)</i>	TOTAL CONTAINERS	PFAS (Long Suite) - Standard LOR	HOLD									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
Borehole 7																
52	BH07_PAVAR	16/10/2023	S	P	1	x										
53	BH07_0.08-0.18	16/10/2023	S	P	1	x										
54	BH07_0.65-0.75	16/10/2023	S	P	1	x										
55	BH07_1.0-1.1	16/10/2023	S	P	1		x									
56	BH07_1.2-1.3	16/10/2023	S	P	1		x									
57	BH07_1.9-2.0	16/10/2023	S	P	1		x									
58	BH07_2.9-3.0	16/10/2023	S	P	1	x										
Borehole 8																
59	BH08_PAVAR	16/10/2023	S	P	1		x									
60	BH08_0.08-0.18	16/10/2023	S	P	1	x										
61	BH08_0.4-0.5	16/10/2023	S	P	1		x									
62	BH08_0.55-0.65	16/10/2023	S	P	1	x										
63	BH08_0.75-0.85	16/10/2023	S	P	1		x									
64	BH08_1.2-1.3	16/10/2023	S	P	1		x									
65	BH08_2.2-2.3	16/10/2023	S	P	1	x										
66	BH08_3.2-3.3	16/10/2023	S	P	1		x									
67	BH08_3.9-4.0	16/10/2023	S	P	1		x									
TOTAL					16											

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 Solids; B = Unpreserved Bag



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date): (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Adelaide	☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT: MFS CAMDEN PARK DSI	ALS QUOTE: EM23GHDSE0022	Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: Angus Robinson	ORDER NO.: 12616802	Other comment:	
SAMPLER: TW (Terrence Wilson)	CONTACT PH: 0431 177 498	RECEIVED BY: Kieren Burns	
COC emailed to ALS? YES	EDD FORMAT (or default): Esdat	RECEIVED BY:	
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com	RELINQUISHED BY: Terrence Wilson	DATE/TIME: 17 October 2023; 15:00	
Email Invoice to: Angus.Robinson@ghd.com; accountspayableAU@ghd.com	DATE/TIME: 17 October 2023; 15:00	DATE/TIME:	

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 (Long Suite) - Standard LOR	HOLD									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
MW01																
68	MW01_CONCRETE	17/10/2023	S	P	1	x										
69	MW01_0.25-0.35	17/10/2023	S	P	1	x										
70	MW01_0.4-0.5	17/10/2023	S	P	1	x										
71	MW01_0.9-1.0	17/10/2023	S	P	1		x									
72	MW01_1.4-1.5	17/10/2023	S	P	1		x									
73	MW01_2.4-2.5	17/10/2023	S	P	1	x										
74	MW01_3.4-3.5	17/10/2023	S	P	1		x									
MW02																
75	MW02_PAVAR	17/10/2023	S	P	1											
76	MW02_0.08-0.18	17/10/2023	S	P	1	x										
77	MW02_0.4-0.5	17/10/2023	S	P	1	x										
78	MW02_0.65-0.75	17/10/2023	S	P	1		x									
79	MW02_1.3-1.4	17/10/2023	S	P	1		x									
80	MW02_2.3-2.4	17/10/2023	S	P	1		x									
81	MW02_3.3-3.4	17/10/2023	S	P	1	x										
82	MW02_3.9-4.0	17/10/2023	S	P	1		x									
TOTAL					15											

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.



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date): (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: EM23GHDSE0022		Custody Seal Intact? Yes No N/A	
PROJECT: MFS CAMDEN PARK DSI	ORDER NO.: 12616802	COC SEQUENCE NUMBER (Circle)		Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT MANAGER: Angus Robinson		COC: 1 2 3 4 5 6 7		Random Sample Temperature on Receipt: °C
CONTACT PH: 0431 177 498		OF: 1 2 3 4 5 6 7		Other comment:
SAMPLER: TW (Terrence Wilson)	SAMPLER MOBILE: 0467 034 756	RELINQUISHED BY: Terrence Wilson	RECEIVED BY: Kieren Burns	RELINQUISHED BY:
COC emailed to ALS? YES	EDD FORMAT (or default): Esdat	DATE/TIME: 17 October 2023; 15:00	DATE/TIME: 17 October 2023; 15:00	RECEIVED BY:
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com		DATE/TIME:		DATE/TIME:
Email Invoice to: Angus.Robinson@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 <i>(refer to codes below)</i>	TOTAL CONTAINERS	PFAS (Long Suite) - Standard LOR	HOLD								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
MW03															
83	MW03_0.01-0.1	17/10/2023	S	P	1	x									
84	MW03_0.15-0.2	17/10/2023	S	P	1		x								
85	MW03_0.4-0.5	17/10/2023	S	P	1	x									
86	MW03_1.3-1.4	17/10/2023	S	P	1		x								
87	MW03_2.0-2.1	17/10/2023	S	P	1		x								
88	MW03_2.9-3.0	17/10/2023	S	P	1	x									
89	MW03_3.4-3.5	17/10/2023	S	P	1		x								
TOTAL					7			#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	

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.



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS : ☒ Standard TAT (List due date): (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: EM23GHDSE0022		Custody Seal Intact? Yes No N/A	
PROJECT: MFS CAMDEN PARK DSI	ORDER NO.: 12616802	COC SEQUENCE NUMBER (Circle)		Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT MANAGER: Angus Robinson	CONTACT PH: 0431 177 498	COC: 1 2 3 4 5 6 7		Random Sample Temperature on Receipt: °C
SAMPLER: TW (Terrence Wilson)	SAMPLER MOBILE: 0467 034 756	RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:
COC emailed to ALS? YES	EDD FORMAT (or default): Esdat	Terrence Wilson	Kieron Burns	
Email Reports to: Angus.Robinson@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Eloiselvy.Garcia@ghd.com; GHDLabReports@ghd.com		DATE/TIME: 17 October 2023; 15:00	DATE/TIME: 17 October 2023; 15:00	DATE/TIME:
Email Invoice to: Angus.Robinson@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 (Long Suite) - Standard LOR	HOLD							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
90	FD01 (Intralab)	16/10/2023	S	P	1	x								
—	FS01 (interlab)	16/10/2023	S	P	1	x	*Please forward to Eurofins*							
91	FD02 (Intralab)	16/10/2023	S	P	1	x								
—	FS02 (interlab)	16/10/2023	S	P	1	x	*Please forward to Eurofins*							
92	FD03 (Intralab)	16/10/2023	S	P	1	x								
93	FS03 (interlab)	16/10/2023	S	P	1	x								
94	FB01	16/10/2023	W	P	1		x							
95	RB01	16/10/2023	W	P	1	x								
96	FD04 (Intralab)	17/10/2023	S	P	1	x								
—	FS04 (interlab)	17/10/2023	S	P	1	x	*Please forward to Eurofins*							
97	FD05 (Intralab)	17/10/2023	S	P	1	x								
—	FS05 (interlab)	17/10/2023	S	P	1	x	*Please forward to Eurofins*							
TOTAL					12									

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.

Ranil Weerakkody

From: Kieren Burns
Sent: Wednesday, 18 October 2023 3:54 PM
To: COC Melbourne
Cc: Dilani Fernando; Sanjay Parekh
Subject: FW: [EXTERNAL] - MFS CAMDEN PARK SOIL SAMPLES COC EM2318553
Attachments: 12616802_MFS Camden Park COC_20231017_ALS.pdf

Hi Guys,

I have attached the COC for these samples from GHD

Regards,



right solutions.
right partner.

Kieren Burns
Business Development Manager - SA

D: +61 8 8162 5130

M: 0448 527 608

kieren.burns@alsglobal.com

Suite D, 32 West Thebarton Road
Thebarton SA 5031
Australia

alsglobal.com



From: Eloise Ivy Garcia <EloiseIvy.Garcia@ghd.com>
Sent: Wednesday, 18 October 2023 3:08 PM
To: Kieren Burns <Kieren.Burns@alsglobal.com>
Cc: Ben Petticrew <Ben.Petticrew@ghd.com>; Angus Robinson <Angus.Robinson@ghd.com>; Terrence Wilson <Terrence.Wilson@ghd.com>
Subject: [EXTERNAL] - MFS CAMDEN PARK SOIL SAMPLES COC

You don't often get email from eloiseivy.garcia@ghd.com. [Learn why this is important](#)

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi Kieren,

Please find the attached COC for the samples relinquished to you yesterday under the project 12616802 MFS Camden Park DSL. Please liaise with Angus Robinson if you have any questions or concerns.

Kind regards,

Eloise Ivy R. Garcia (she/her)
BSc Geology
Environmental Scientist – South Australia

GHD

Proudly employee-owned | ghd.com

L4 211 Victoria Square, Adelaide SA 5000 Australia
M +61 420317959 E EloiseIvy.Garcia@ghd.com

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Ranil Weerakkody

From: Kieren Burns
Sent: Wednesday, 18 October 2023 4:07 PM
To: COC Melbourne
Subject: FW: [EXTERNAL] - MFS CAMDEN PARK SOIL SAMPLES COC EM2318553

Hi Guys,

Can you please add in the EP231X analysis on samples

- BH05_0.08-0.18
- BH05_0.4-0.5
- BH05_2.0-2.1

As per the request from Angus below if not noted on the COC sent through previously.

Regards,



right solutions.
right partner.

Kieren Burns
Business Development Manager - SA

D: +61 8 8162 5130
M: 0448 527 608
kieren.burns@alsglobal.com

Suite D, 32 West Thebarton Road
Thebarton SA 5031
Australia
alsglobal.com



From: Angus Robinson <Angus.Robinson@ghd.com>
Sent: Wednesday, 18 October 2023 3:34 PM
To: Kieren Burns <Kieren.Burns@alsglobal.com>
Cc: Ben Petticrew <Ben.Petticrew@ghd.com>; Terrence Wilson <Terrence.Wilson@ghd.com>; Eloise Ivy Garcia <EloiseIvy.Garcia@ghd.com>
Subject: RE: [EXTERNAL] - MFS CAMDEN PARK SOIL SAMPLES COC

Hi Kieren,

As part of this batch, we also require analysis for a PFAS long suite (Standard LOR) on the following samples:

- BH05_0.08-0.18
- BH05_0.4-0.5
- BH05_2.0-2.1

Kind regards,

From: Kieren Burns <Kieren.Burns@alsglobal.com>
Sent: Wednesday, October 18, 2023 3:33 PM
To: Eloise Ivy Garcia <EloiseIvy.Garcia@ghd.com>
Cc: Ben Petticrew <Ben.Petticrew@ghd.com>; Angus Robinson <Angus.Robinson@ghd.com>; Terrence Wilson <Terrence.Wilson@ghd.com>
Subject: RE: [EXTERNAL] - MFS CAMDEN PARK SOIL SAMPLES COC

Thanks Eloise,

I have forwarded this to Melbourne to match up with the samples received today

Regards,



right solutions.
right partner.

Kieren Burns
Business Development Manager - SA

D: +61 8 8162 5130
M: 0448 527 608
kieren.burns@alsglobal.com

Suite D, 32 West Thebarton Road
Thebarton SA 5031
Australia

alsglobal.com



From: Eloise Ivy Garcia <EloiseIvy.Garcia@ghd.com>
Sent: Wednesday, 18 October 2023 3:08 PM
To: Kieren Burns <Kieren.Burns@alsglobal.com>
Cc: Ben Petticrew <Ben.Petticrew@ghd.com>; Angus Robinson <Angus.Robinson@ghd.com>; Terrence Wilson <Terrence.Wilson@ghd.com>
Subject: [EXTERNAL] - MFS CAMDEN PARK SOIL SAMPLES COC

You don't often get email from eloiseivy.garcia@ghd.com. [Learn why this is important](#)

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi Kieren,

Please find the attached COC for the samples relinquished to you yesterday under the project 12616802 MFS Camden Park DSL. Please liaise with Angus Robinson if you have any questions or concerns.

Kind regards,

Eloise Ivy R. Garcia (she/her)
BSc Geology
Environmental Scientist – South Australia

SAMPLES RECEIVED WITHOUT COC

CLIENT: GHD	CARRIER: STARTRACK
PROJECT / QUOTE: 12616802	CONNOTE #: 3 ZIZ 50000459
CONTACT NAME:	AWB #:
CONTACT NUMBER:	# OF ESKIES: SECURITY SEAL: (Y) N N/A
SAMPLER NAME: TW	TYPE OF ESKIES: 3 eskies
SAMPLER NUMBER:	ESKY NUMBERS:
SAMPLES RECEIVED BY: BL (ALS)	# OF SAMPLES:
DATE/TIME RECEIVED: 18/10/2023 CLIENT SERVICES NOTIFIED BY:	TEMPERATURE: 9.0°C

Environmental Division
Melbourne
Work Order Reference
EM2318553



Telephone: +61-3-8549 9600

LAB ID	12:50 SAMPLE DETAILS				NUMBER OF CONTAINERS	ADDITIONAL INFORMATION / COMMENTS:	
	SAMPLE ID	DATE	MATRIX			OTHER INFORMATION:	
						☐ MICRO ☐ BIOSECURITY ☐ BROKEN CONTAINERS ☐ COC EMAILED ☐ ALS COMPASS	
1	BH02 - 49-5.0	16/10/23	S	1		PFAS FREIGHT	
2	BH02 - 2.5 - 2.6	"	"	"			
3	RB02	17/10/23	W	1			
4	MW01 - 0.9 - 1.0	"	S	1			
5							
				TOTAL			

CORRESPONDENCE (DATE, INITIALS - DETAILS OF CORRESPONDENCE):



CERTIFICATE OF ANALYSIS

Work Order	: EM2318553	Page	: 1 of 23
Client	: GHD PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: ANGUS ROBINSON	Contact	: Kieren Burns
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: MFS CAMDEN PARK DSI	Date Samples Received	: 18-Oct-2023 12:50
Order number	: 12616802	Date Analysis Commenced	: 19-Oct-2023
C-O-C number	: ----	Issue Date	: 23-Oct-2023 15:41
Sampler	: TW		
Site	: ----		
Quote number	: EM23GHDSER0022		
No. of samples received	: 100		
No. of samples analysed	: 46		



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
Nancy Wang	2IC Organic Chemist	Melbourne Organics, 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.

- 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.
- EP231X-INJ: The direct injection LCMSMS method may be used where the sample matrix is not suitable for Solid Phase Extraction (e.g. significant particulate load) or where only a single sample container is received.



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH01_0.4-0.5	BH01_1.7-1.8	BH01_2.7-2.8	BH02_PAVER	BH02_0.08-0.18
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-001	EM2318553-004	EM2318553-005	EM2318553-008	EM2318553-009
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	8.7	14.6	18.1	4.4	5.9
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0038	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0020	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0011	0.0010	0.0005	0.0138	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0009	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0085	0.0011	0.0006	0.0419	0.0114
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	0.002	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0018	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0004	<0.0002	0.0082	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0005	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0013	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTTrDA)	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	0.0004	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH01_0.4-0.5	BH01_1.7-1.8	BH01_2.7-2.8	BH02_PAVER	BH02_0.08-0.18
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-001	EM2318553-004	EM2318553-005	EM2318553-008	EM2318553-009
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	0.0060	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	0.0006	<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	0.0096	0.0025	0.0011	0.0832	0.0114
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0096	0.0021	0.0011	0.0557	0.0114
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0096	0.0025	0.0011	0.0799	0.0114
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	122	126	104	122	114
13C8-PFOA	----	0.0002	%	97.5	100	96.4	92.5	100



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH02_0.4-0.5	BH02_2.5-2.6	BH03_0.08-0.18	BH03_0.75-0.85	BH03_2.6-2.7
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-010	EM2318553-015	EM2318553-019	EM2318553-021	EM2318553-024
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	8.4	19.3	8.3	13.3	16.1
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<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	0.0007	0.0004	0.0002	0.0015	0.0004
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	0.114	0.0056	0.0018	0.0165	<0.0002
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0005	<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	0.0003	<0.0002	<0.0002	0.0004	<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	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTTrDA)	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
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH02_0.4-0.5	BH02_2.5-2.6	BH03_0.08-0.18	BH03_0.75-0.85	BH03_2.6-2.7
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-010	EM2318553-015	EM2318553-019	EM2318553-021	EM2318553-024
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	0.116	0.0060	0.0020	0.0187	0.0004
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.115	0.0060	0.0020	0.0180	0.0004
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.115	0.0060	0.0020	0.0187	0.0004
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	122	132	112	126	102
13C8-PFOA	----	0.0002	%	95.0	93.2	96.5	90.2	102



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH03_3.6-3.7	BH04_0.08-0.18	BH04_0.65-0.75	BH04_2.1-2.2	BH05_PAVER
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-025	EM2318553-028	EM2318553-030	EM2318553-033	EM2318553-036
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	19.8	4.2	22.4	14.4	5.3
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0019	<0.0002	0.0589
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0025	<0.0002	0.0506
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0005	0.0202	<0.0002	0.186
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0003	<0.0002	0.0081
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.0153	0.0503	<0.0002	0.120
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0018
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	0.008
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.0004	<0.0002	0.0115
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.0024	<0.0002	0.129
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0003	<0.0002	0.0126
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.0005	<0.0002	0.0176
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTTrDA)	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	0.0006
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH03_3.6-3.7	BH04_0.08-0.18	BH04_0.65-0.75	BH04_2.1-2.2	BH05_PAVER
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-025	EM2318553-028	EM2318553-030	EM2318553-033	EM2318553-036
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	<0.0002	0.0158	0.0788	<0.0002	0.605
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	0.0158	0.0705	<0.0002	0.306
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	0.0158	0.0760	<0.0002	0.544
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	122	118	134	129	106
13C8-PFOA	----	0.0002	%	99.5	98.8	101	97.8	94.0



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH05_0.08-0.18	BH05_0.4-0.5	BH05_2.0-2.1	BH06_0.08-0.18	BH06_0.6-0.7
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-037	EM2318553-039	EM2318553-041	EM2318553-044	EM2318553-047
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	5.8	11.3	23.1	5.2	8.7
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0015
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0021
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0007	0.0015	<0.0002	<0.0002	0.0309
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0002	0.0004	<0.0002	<0.0002	0.0057
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0675	0.228	<0.0002	0.0052	0.228
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0003	<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	0.0003
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0003	<0.0002	<0.0002	0.0040
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0004
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0002	<0.0002	<0.0002	0.0024
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTriDA)	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	0.0006	0.0012	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH05_0.08-0.18	BH05_0.4-0.5	BH05_2.0-2.1	BH06_0.08-0.18	BH06_0.6-0.7
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-037	EM2318553-039	EM2318553-041	EM2318553-044	EM2318553-047
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	0.0690	0.232	<0.0002	0.0052	0.275
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0682	0.230	<0.0002	0.0052	0.259
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0682	0.230	<0.0002	0.0052	0.268
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	102	113	98.8	126	110
13C8-PFOA	----	0.0002	%	97.6	97.2	104	90.2	96.8



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH06_2.9-3.0	BH07_PAVER	BH07_0.08-0.18	BH07_0.65-0.75	BH07_2.9-3.0
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-051	EM2318553-052	EM2318553-053	EM2318553-054	EM2318553-058
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	17.5	4.1	6.6	8.9	16.8
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	0.0006	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.0004	0.0134	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0012	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0016	0.0016	0.0018	0.0130	<0.0002
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	0.0005	<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	0.0012	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTTrDA)	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
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH06_2.9-3.0	BH07_PAVER	BH07_0.08-0.18	BH07_0.65-0.75	BH07_2.9-3.0
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-051	EM2318553-052	EM2318553-053	EM2318553-054	EM2318553-058
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	0.0016	0.0016	0.0022	0.0299	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0016	0.0016	0.0022	0.0264	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0016	0.0016	0.0022	0.0281	<0.0002
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	109	109	98.0	95.0	110
13C8-PFOA	----	0.0002	%	104	105	96.0	98.6	99.1



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH08_0.08-0.18	BH08_0.55-0.65	BH08_2.2-2.3	MW01_CONCRETE	MW01_0.25-0.35
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-060	EM2318553-062	EM2318553-065	EM2318553-068	EM2318553-069
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	7.4	6.7	15.3	4.8	8.9
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0152	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0063	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0009	<0.0002	0.0066	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0007	0.0100	<0.0002	0.0031	0.0023
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	0.004	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0073	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0003	<0.0002	0.0272	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0008	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTTrDA)	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
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH08_0.08-0.18	BH08_0.55-0.65	BH08_2.2-2.3	MW01_CONCRETE	MW01_0.25-0.35
Sampling date / time				16-Oct-2023 00:00	16-Oct-2023 00:00	16-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-060	EM2318553-062	EM2318553-065	EM2318553-068	EM2318553-069
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	0.0007	0.0112	<0.0002	0.0711	0.0023
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0007	0.0109	<0.0002	0.0097	0.0023
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0007	0.0112	<0.0002	0.0645	0.0023
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	99.5	96.0	104	104	100
13C8-PFOA	----	0.0002	%	100	101	98.4	95.0	97.2



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				MW01_0.4-0.5	MW01_2.4-2.5	MW02_0.08-0.18	MW02_04.-0.5	MW02_3.3-3.4
Sampling date / time				17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-070	EM2318553-073	EM2318553-076	EM2318553-077	EM2318553-081
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	7.8	19.4	4.9	6.9	24.8
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	0.0004	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0003	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0660	0.0003	0.0004	0.0025	<0.0002
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	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTTrDA)	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
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				MW01_0.4-0.5	MW01_2.4-2.5	MW02_0.08-0.18	MW02_04.-0.5	MW02_3.3-3.4
Sampling date / time				17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-070	EM2318553-073	EM2318553-076	EM2318553-077	EM2318553-081
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	0.0669	0.0003	0.0004	0.0029	<0.0002
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0664	0.0003	0.0004	0.0025	<0.0002
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0664	0.0003	0.0004	0.0029	<0.0002
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	95.6	99.2	106	103	100
13C8-PFOA	----	0.0002	%	100	102	98.2	102	97.6



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW03_0.01-0.1	MW03_0.4-0.5	MW03_2.9-3.0	FD01 (intralab)	FD02 (intralab)
Sampling date / time					17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00
Compound	CAS Number	LOR	Unit		EM2318553-083	EM2318553-085	EM2318553-088	EM2318553-090	EM2318553-091
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		24.6	10.3	17.2	4.1	5.5
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		0.0094	0.0011	<0.0002	0.0067	0.0039
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	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
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 (PFTTrDA)	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
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				MW03_0.01-0.1	MW03_0.4-0.5	MW03_2.9-3.0	FD01 (intralab)	FD02 (intralab)
Sampling date / time				17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2318553-083	EM2318553-085	EM2318553-088	EM2318553-090	EM2318553-091
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	0.0094	0.0013	0.0002	0.0069	0.0039
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0094	0.0013	0.0002	0.0069	0.0039
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0094	0.0013	0.0002	0.0069	0.0039
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0002	%	110	105	101	104	89.4
13C8-PFOA	----	0.0002	%	112	97.4	100	97.4	94.8



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				FD03 (intralab)	FS03 (interlab)	FD04 (intralab)	FD05 (intralab)	----
Sampling date / time				17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	----
Compound	CAS Number	LOR	Unit	EM2318553-092	EM2318553-093	EM2318553-096	EM2318553-097	-----
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	7.0	7.1	8.8	5.9	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0128	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0055	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0066	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0008	0.0008	0.0014	0.0039	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<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	0.004	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0074	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0320	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0010	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0004	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<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	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.0002	mg/kg	<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	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	FD03 (intralab)	FS03 (interlab)	FD04 (intralab)	FD05 (intralab)	----
Sampling date / time					17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	17-Oct-2023 00:00	----
Compound	CAS Number	LOR	Unit		EM2318553-092	EM2318553-093	EM2318553-096	EM2318553-097	-----
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<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	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<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	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<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	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<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	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		0.0008	0.0008	0.0014	0.0739	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0008	0.0008	0.0014	0.0105	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0008	0.0008	0.0014	0.0681	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		110	112	111	106	----
13C8-PFOA	----	0.0002	%		102	102	96.8	99.8	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				RB01	RB02	----	----	----
Sampling date / time				17-Oct-2023 00:00	17-Oct-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2318553-095	EM2318553-099	-----	-----	-----
				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	0.10	µg/L	<0.10	<0.10	----	----	----
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 (PFTTrDA)	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	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				RB01	RB02	----	----	----
Sampling date / time				17-Oct-2023 00:00	17-Oct-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2318553-095	EM2318553-099	-----	-----	-----
				Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
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	%	111	114	----	----	----
13C8-PFOA	----	0.02	%	101	99.7	----	----	----



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



QUALITY CONTROL REPORT

Work Order	: EM2318553	Page	: 1 of 19
Client	: GHD PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: ANGUS ROBINSON	Contact	: Kieren Burns
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: MFS CAMDEN PARK DSI	Date Samples Received	: 18-Oct-2023
Order number	: 12616802	Date Analysis Commenced	: 19-Oct-2023
C-O-C number	: ----	Issue Date	: 23-Oct-2023
Sampler	: TW		
Site	: ----		
Quote number	: EM23GHDSE0022		
No. of samples received	: 100		
No. of samples analysed	: 46		



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
Nancy Wang	2IC Organic Chemist	Melbourne Organics, 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

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: 5371282)									
EM2318553-001	BH01_0.4-0.5	EA055: Moisture Content	----	0.1	%	8.7	8.6	0.0	0% - 20%
EM2318553-025	BH03_3.6-3.7	EA055: Moisture Content	----	0.1	%	19.8	19.8	0.0	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5371283)									
EM2318553-054	BH07_0.65-0.75	EA055: Moisture Content	----	0.1	%	8.9	8.8	1.5	0% - 20%
EM2318553-077	MW02_04.-0.5	EA055: Moisture Content	----	0.1	%	6.9	6.2	10.9	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5371284)									
EM2318553-097	FD05 (intralab)	EA055: Moisture Content	----	0.1	%	5.9	6.5	10.3	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5372485)									
EM2318553-037	BH05_0.08-0.18	EA055: Moisture Content	----	0.1	%	5.8	5.3	8.4	0% - 20%
EM2318647-011	Anonymous	EA055: Moisture Content	----	0.1	%	19.6	19.0	3.3	0% - 50%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5371165)									
EM2318553-001	BH01_0.4-0.5	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	0.0011	0.0012	11.0	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	0.0085	0.0101	17.3	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EM2318553-025	BH03_3.6-3.7	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



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 (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5372131)									
EM2318553-037	BH05_0.08-0.18	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	0.0007	0.0007	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	0.0675	0.0669	0.9	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EM2318553-070	MW01_0.4-0.5	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	0.0004	0.0004	0.0	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0003	0.0002	0.0	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0660	0.0669	1.3	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5372137)									
EM2318553-092	FD03 (intralab)	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	0.0008	0.0007	14.5	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EM2318677-001	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	0.0019	0.0019	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	0.122	0.112	8.2	0% - 20%
		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: 5371165)									
EM2318553-001	BH01_0.4-0.5	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
EM2318553-025	BH03_3.6-3.7	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



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: 5371165) - continued									
EM2318553-025	BH03_3.6-3.7	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 (PFTTrDA)	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5372131)									
EM2318553-037	BH05_0.08-0.18	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 (PFTTrDA)	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
EM2318553-070	MW01_0.4-0.5	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 (PFTTrDA)	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
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 5372137)									
EM2318553-092	FD03 (intralab)	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



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: 5372137) - continued									
EM2318553-092	FD03 (intralab)	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
EM2318677-001	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	<0.0002	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: 5371165)									
EM2318553-001	BH01_0.4-0.5	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
EM2318553-025	BH03_3.6-3.7	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



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: 5372131)									
EM2318553-037	BH05_0.08-0.18	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	0.0006	0.0003	70.3	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
EM2318553-070	MW01_0.4-0.5	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
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5372137)									
EM2318553-092	FD03 (intralab)	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
EM2318677-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	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: 5372137) - continued									
EM2318677-001	Anonymous	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: 5371165)									
EM2318553-001	BH01_0.4-0.5	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
EM2318553-025	BH03_3.6-3.7	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5372131)									
EM2318553-037	BH05_0.08-0.18	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
EM2318553-070	MW01_0.4-0.5	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5372131) - continued									
EM2318553-070	MW01_0.4-0.5	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5372137)									
EM2318553-092	FD03 (intralab)	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
EM2318677-001	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: 5371165)									
EM2318553-001	BH01_0.4-0.5	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0096	0.0113	16.3	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0096	0.0113	16.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0096	0.0113	16.3	0% - 20%
EM2318553-025	BH03_3.6-3.7	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
EP231P: PFAS Sums (QC Lot: 5372131)									
EM2318553-037	BH05_0.08-0.18	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0690	0.0681	1.3	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0682	0.0676	0.9	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0682	0.0676	0.9	0% - 20%
EM2318553-070	MW01_0.4-0.5	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0669	0.0677	1.2	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0664	0.0673	1.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0664	0.0673	1.3	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 (%)
EP231P: PFAS Sums (QC Lot: 5372137)									
EM2318553-092	FD03 (intralab)	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0008	0.0007	13.3	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0008	0.0007	13.3	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0008	0.0007	13.3	No Limit
EM2318677-001	Anonymous	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.124	0.114	8.4	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.124	0.114	8.4	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.124	0.114	8.4	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 (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5375996)									
EM2318553-095	RB01	EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: 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: 5375996)									
EM2318553-095	RB01	EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.10	<0.10	0.0	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 5375996)									
EM2318553-095	RB01	EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	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: 5375996) - continued									
EM2318553-095	RB01	EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X-INJ: 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: 5375996)									
EM2318553-095	RB01	EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X-INJ: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X-INJ: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.0	No Limit
		EP231X-INJ: 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: 5375996)									
EM2318553-095	RB01	EP231X-INJ: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X-INJ: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.0	No Limit
		EP231X-INJ: 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: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5371165)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	101	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	92.4	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	105	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	104	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	96.9	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	111	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5372131)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	87.9	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	87.9	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	101	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	100	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	97.8	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	89.9	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5372137)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	87.1	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	86.1	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	94.2	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	105	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	94.0	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	102	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5371165)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	105	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	71.4	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.6	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.6	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.4	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.6	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.1	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.9	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.2	69.0	135



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5371165) - continued								
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	74.0	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5372131)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	83.6	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.6	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.9	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.3	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.8	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.3	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.2	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.2	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.0	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.6	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.0	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5372137)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	82.9	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.9	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.0	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.6	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.7	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.2	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.0	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.3	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	82.8	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	77.9	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.0	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5371165)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.7	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.6	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.8	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.4	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.3	70.0	130



Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5371165) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.1	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.8	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5372131)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	101	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.9	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.0	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	95.4	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	106	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.8	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5372137)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.4	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.0	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	94.2	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	90.8	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.7	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.9	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5371165)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	102	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	87.8	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	97.0	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	120	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5372131)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	95.6	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	98.2	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	89.9	65.0	137



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5372131) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00121 mg/kg	94.4	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5372137)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	86.2	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	94.5	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	93.0	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	102	70.0	130
EP231P: PFAS Sums (QCLot: 5371165)								
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	----	----	----	----
EP231P: PFAS Sums (QCLot: 5372131)								
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	----	----	----	----
EP231P: PFAS Sums (QCLot: 5372137)								
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 Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5375996)								
EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.444 µg/L	76.7	72.0	130
EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.471 µg/L	74.5	71.0	127
EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.457 µg/L	73.6	68.0	131
EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.477 µg/L	78.6	69.0	134
EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.465 µg/L	73.3	65.0	140
EP231X-INJ: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.482 µg/L	76.2	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5375996)								
EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.10	2.5 µg/L	74.9	73.0	129
EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	73.7	72.0	129
EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	78.7	72.0	129



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5375996) - continued								
EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	75.2	72.0	130
EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	73.9	71.0	133
EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	73.8	69.0	130
EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	71.4	71.0	129
EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	76.9	69.0	133
EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	79.0	72.0	134
EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	75.4	65.0	144
EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	72.7	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5375996)								
EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	74.8	67.0	137
EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	78.9	68.0	141
EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	72.3	70.0	130
EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	71.3	70.0	130
EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	70.5	70.0	130
EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	87.0	65.0	136
EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	76.5	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5375996)								
EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.469 µg/L	80.1	63.0	143
EP231X-INJ: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.476 µg/L	79.2	64.0	140
EP231X-INJ: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.48 µg/L	87.5	67.0	138
EP231X-INJ: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.483 µg/L	72.0	70.0	130
EP231P: PFAS Sums (QCLot: 5375996)								
EP231X-INJ: Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----
EP231X-INJ: Sum of PFHxS and PFOS	355-46-4/17 63-23-1	0.01	µg/L	<0.01	----	----	----	----
EP231X-INJ: 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**

Matrix Spike (MS) Report



Sub-Matrix: **SOIL**

Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5371165)							
EM2318553-004	BH01_1.7-1.8	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	110	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	88.1	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	82.2	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	91.0	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	69.5	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00121 mg/kg	95.5	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5372131)							
EM2318553-039	BH05_0.4-0.5	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	83.0	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	91.7	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	75.1	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	84.8	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	127	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5372137)							
EM2318553-093	FS03 (interlab)	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	84.2	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	73.8	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	84.1	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	100	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	107	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00121 mg/kg	100.0	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5371165)							
EM2318553-004	BH01_1.7-1.8	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	116	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	70.6	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	103	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	89.4	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	88.2	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	94.0	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	90.8	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	89.8	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	97.4	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.00125 mg/kg	109	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	75.0	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5372131)							
EM2318553-039	BH05_0.4-0.5	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	84.7	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	90.5	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	84.9	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	90.0	71.0	131



Sub-Matrix: **SOIL**

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: 5372131) - continued							
EM2318553-039	BH05_0.4-0.5	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	89.5	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	89.1	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	89.7	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	89.8	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	96.6	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	96.5	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	91.6	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5372137)							
EM2318553-093	FS03 (interlab)	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	89.9	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	80.7	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	98.9	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	85.6	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	89.6	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	93.2	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	83.6	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	93.3	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	85.1	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	78.3	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	91.0	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5371165)							
EM2318553-004	BH01_1.7-1.8	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	75.4	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	101	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	97.8	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	94.1	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	87.0	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	92.6	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	81.4	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5372131)							
EM2318553-039	BH05_0.4-0.5	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	89.8	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	112	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	85.2	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	85.6	70.0	130



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5375996) - continued							
EM2318553-099	RB02	EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.444 µg/L	85.7	72.0	130
		EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.471 µg/L	78.6	71.0	127
		EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.457 µg/L	73.8	68.0	131
		EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.477 µg/L	91.0	69.0	134
		EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.465 µg/L	83.1	65.0	140
		EP231X-INJ: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.482 µg/L	88.3	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5375996)							
EM2318553-099	RB02	EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	83.3	73.0	129
		EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	77.2	72.0	129
		EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	90.2	72.0	129
		EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	81.2	72.0	130
		EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	82.2	71.0	133
		EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	86.1	69.0	130
		EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	83.3	71.0	129
		EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	91.7	69.0	133
		EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	92.0	72.0	134
		EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	91.0	65.0	144
		EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	84.3	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5375996)							
EM2318553-099	RB02	EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	81.9	67.0	137
		EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	103	68.0	141
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	77.4	70.0	130
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	80.0	70.0	130
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	76.0	70.0	130
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	88.7	65.0	136
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	85.3	61.0	135
		EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5375996)					
EM2318553-099	RB02	EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.469 µg/L	89.9	63.0	143
		EP231X-INJ: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.476 µg/L	86.6	64.0	140
		EP231X-INJ: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.48 µg/L	96.4	67.0	138
		EP231X-INJ: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.483 µg/L	83.0	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EM2318553**

Page : 1 of 10

Client : **GHD PTY LTD**
Contact : **ANGUS ROBINSON**
Project : **MFS CAMDEN PARK DSI**
Site : **----**
Sampler : **TW**
Order number : **12616802**

Laboratory : **Environmental Division Melbourne**
Telephone : **+61881625130**
Date Samples Received : **18-Oct-2023**
Issue Date : **23-Oct-2023**
No. of samples received : **100**
No. of samples analysed : **46**

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, **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	EM2318553--039	BH05_0.4-0.5	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

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	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar (EA055) BH01_0.4-0.5, BH01_2.7-2.8, BH02_0.08-0.18, BH02_2.5-2.6, BH03_0.75-0.85, BH03_3.6-3.7, BH04_0.65-0.75, BH05_PAVER, BH06_0.6-0.7, BH07_PAVER, BH07_0.65-0.75, BH08_0.08-0.18, BH08_2.2-2.3	BH01_1.7-1.8, BH02_PAVER, BH02_0.4-0.5, BH03_0.08-0.18, BH03_2.6-2.7, BH04_0.08-0.18, BH04_2.1-2.2, BH06_0.08-0.18, BH06_2.9-3.0, BH07_0.08-0.18, BH07_2.9-3.0, BH08_0.55-0.65,	16-Oct-2023	----	----	----	19-Oct-2023	30-Oct-2023	✔
HDPE Soil Jar (EA055) BH05_0.08-0.18, BH05_2.0-2.1	BH05_0.4-0.5,	16-Oct-2023	----	----	----	20-Oct-2023	30-Oct-2023	✔
HDPE Soil Jar (EA055)								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content (Dried @ 105-110°C) - Continued								
MW01_CONCRETE, MW01_0.4-0.5, MW02_0.08-0.18, MW02_3.3-3.4, MW03_0.4-0.5, FD01 (intralab), FD03 (intralab), FD04 (intralab),	MW01_0.25-0.35, MW01_2.4-2.5, MW02_04.-0.5, MW03_0.01-0.1, MW03_2.9-3.0, FD02 (intralab), FS03 (interlab), FD05 (intralab)	17-Oct-2023	----	----	----	19-Oct-2023	31-Oct-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) BH01_0.4-0.5, BH01_2.7-2.8, BH02_0.08-0.18, BH02_2.5-2.6, BH03_0.75-0.85, BH03_3.6-3.7, BH04_0.65-0.75, BH05_PAVER, BH06_0.6-0.7, BH07_PAVER,	BH01_1.7-1.8, BH02_PAVER, BH02_0.4-0.5, BH03_0.08-0.18, BH03_2.6-2.7, BH04_0.08-0.18, BH04_2.1-2.2, BH06_0.08-0.18, BH06_2.9-3.0, BH07_0.08-0.18	16-Oct-2023	19-Oct-2023	13-Apr-2024	✓	20-Oct-2023	28-Nov-2023	✓
HDPE Soil Jar (EP231X) BH05_0.08-0.18, BH05_2.0-2.1, BH07_2.9-3.0, BH08_0.55-0.65,	BH05_0.4-0.5, BH07_0.65-0.75, BH08_0.08-0.18, BH08_2.2-2.3	16-Oct-2023	20-Oct-2023	13-Apr-2024	✓	23-Oct-2023	29-Nov-2023	✓
HDPE Soil Jar (EP231X) MW01_CONCRETE, MW01_0.4-0.5, MW02_0.08-0.18, MW02_3.3-3.4, MW03_0.4-0.5, FD01 (intralab), FD03 (intralab), FD04 (intralab),	MW01_0.25-0.35, MW01_2.4-2.5, MW02_04.-0.5, MW03_0.01-0.1, MW03_2.9-3.0, FD02 (intralab), FS03 (interlab), FD05 (intralab)	17-Oct-2023	20-Oct-2023	14-Apr-2024	✓	23-Oct-2023	29-Nov-2023	✓



Matrix: SOIL

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) BH01_0.4-0.5, BH01_2.7-2.8, BH02_0.08-0.18, BH02_2.5-2.6, BH03_0.75-0.85, BH03_3.6-3.7, BH04_0.65-0.75, BH05_PAVER, BH06_0.6-0.7, BH07_PAVER,	BH01_1.7-1.8, BH02_PAVER, BH02_0.4-0.5, BH03_0.08-0.18, BH03_2.6-2.7, BH04_0.08-0.18, BH04_2.1-2.2, BH06_0.08-0.18, BH06_2.9-3.0, BH07_0.08-0.18	16-Oct-2023	19-Oct-2023	13-Apr-2024	✔	20-Oct-2023	28-Nov-2023	✔
HDPE Soil Jar (EP231X) BH05_0.08-0.18, BH05_2.0-2.1, BH07_2.9-3.0, BH08_0.55-0.65,	BH05_0.4-0.5, BH07_0.65-0.75, BH08_0.08-0.18, BH08_2.2-2.3	16-Oct-2023	20-Oct-2023	13-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔
HDPE Soil Jar (EP231X) MW01_CONCRETE, MW01_0.4-0.5, MW02_0.08-0.18, MW02_3.3-3.4, MW03_0.4-0.5, FD01 (intralab), FD03 (intralab), FD04 (intralab),	MW01_0.25-0.35, MW01_2.4-2.5, MW02_04.-0.5, MW03_0.01-0.1, MW03_2.9-3.0, FD02 (intralab), FS03 (interlab), FD05 (intralab)	17-Oct-2023	20-Oct-2023	14-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔



Matrix: SOIL

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) BH01_0.4-0.5, BH01_2.7-2.8, BH02_0.08-0.18, BH02_2.5-2.6, BH03_0.75-0.85, BH03_3.6-3.7, BH04_0.65-0.75, BH05_PAVER, BH06_0.6-0.7, BH07_PAVER,	BH01_1.7-1.8, BH02_PAVER, BH02_0.4-0.5, BH03_0.08-0.18, BH03_2.6-2.7, BH04_0.08-0.18, BH04_2.1-2.2, BH06_0.08-0.18, BH06_2.9-3.0, BH07_0.08-0.18	16-Oct-2023	19-Oct-2023	13-Apr-2024	✔	20-Oct-2023	28-Nov-2023	✔
HDPE Soil Jar (EP231X) BH05_0.08-0.18, BH05_2.0-2.1, BH07_2.9-3.0, BH08_0.55-0.65,	BH05_0.4-0.5, BH07_0.65-0.75, BH08_0.08-0.18, BH08_2.2-2.3	16-Oct-2023	20-Oct-2023	13-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔
HDPE Soil Jar (EP231X) MW01_CONCRETE, MW01_0.4-0.5, MW02_0.08-0.18, MW02_3.3-3.4, MW03_0.4-0.5, FD01 (intralab), FD03 (intralab), FD04 (intralab),	MW01_0.25-0.35, MW01_2.4-2.5, MW02_04.-0.5, MW03_0.01-0.1, MW03_2.9-3.0, FD02 (intralab), FS03 (interlab), FD05 (intralab)	17-Oct-2023	20-Oct-2023	14-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔



Matrix: SOIL

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) BH01_0.4-0.5, BH01_2.7-2.8, BH02_0.08-0.18, BH02_2.5-2.6, BH03_0.75-0.85, BH03_3.6-3.7, BH04_0.65-0.75, BH05_PAVER, BH06_0.6-0.7, BH07_PAVER,	BH01_1.7-1.8, BH02_PAVER, BH02_0.4-0.5, BH03_0.08-0.18, BH03_2.6-2.7, BH04_0.08-0.18, BH04_2.1-2.2, BH06_0.08-0.18, BH06_2.9-3.0, BH07_0.08-0.18	16-Oct-2023	19-Oct-2023	13-Apr-2024	✔	20-Oct-2023	28-Nov-2023	✔
HDPE Soil Jar (EP231X) BH05_0.08-0.18, BH05_2.0-2.1, BH07_2.9-3.0, BH08_0.55-0.65,	BH05_0.4-0.5, BH07_0.65-0.75, BH08_0.08-0.18, BH08_2.2-2.3	16-Oct-2023	20-Oct-2023	13-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔
HDPE Soil Jar (EP231X) MW01_CONCRETE, MW01_0.4-0.5, MW02_0.08-0.18, MW02_3.3-3.4, MW03_0.4-0.5, FD01 (intralab), FD03 (intralab), FD04 (intralab),	MW01_0.25-0.35, MW01_2.4-2.5, MW02_04.-0.5, MW03_0.01-0.1, MW03_2.9-3.0, FD02 (intralab), FS03 (interlab), FD05 (intralab)	17-Oct-2023	20-Oct-2023	14-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) BH01_0.4-0.5, BH01_2.7-2.8, BH02_0.08-0.18, BH02_2.5-2.6, BH03_0.75-0.85, BH03_3.6-3.7, BH04_0.65-0.75, BH05_PAVER, BH06_0.6-0.7, BH07_PAVER, BH01_1.7-1.8, BH02_PAVER, BH02_0.4-0.5, BH03_0.08-0.18, BH03_2.6-2.7, BH04_0.08-0.18, BH04_2.1-2.2, BH06_0.08-0.18, BH06_2.9-3.0, BH07_0.08-0.18	16-Oct-2023	19-Oct-2023	13-Apr-2024	✔	20-Oct-2023	28-Nov-2023	✔	
HDPE Soil Jar (EP231X) BH05_0.08-0.18, BH05_2.0-2.1, BH07_2.9-3.0, BH08_0.55-0.65, BH05_0.4-0.5, BH07_0.65-0.75, BH08_0.08-0.18, BH08_2.2-2.3	16-Oct-2023	20-Oct-2023	13-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔	
HDPE Soil Jar (EP231X) MW01_CONCRETE, MW01_0.4-0.5, MW02_0.08-0.18, MW02_3.3-3.4, MW03_0.4-0.5, FD01 (intralab), FD03 (intralab), FD04 (intralab), MW01_0.25-0.35, MW01_2.4-2.5, MW02_04.-0.5, MW03_0.01-0.1, MW03_2.9-3.0, FD02 (intralab), FS03 (interlab), FD05 (intralab)	17-Oct-2023	20-Oct-2023	14-Apr-2024	✔	23-Oct-2023	29-Nov-2023	✔	

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X-INJ) RB01,	RB02	17-Oct-2023	23-Oct-2023	14-Apr-2024	✓	23-Oct-2023	14-Apr-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X-INJ) RB01,	RB02	17-Oct-2023	23-Oct-2023	14-Apr-2024	✓	23-Oct-2023	14-Apr-2024	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-INJ) RB01,	RB02	17-Oct-2023	23-Oct-2023	14-Apr-2024	✓	23-Oct-2023	14-Apr-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-INJ) RB01,	RB02	17-Oct-2023	23-Oct-2023	14-Apr-2024	✓	23-Oct-2023	14-Apr-2024	✓



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-INJ)								
RB01,	RB02	17-Oct-2023	23-Oct-2023	14-Apr-2024	✓	23-Oct-2023	14-Apr-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	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	7	61	11.48	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	6	58	10.34	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	58	5.17	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	58	5.17	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	58	5.17	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	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	2	50.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	2	50.00	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 5.3, table B-15 requirements.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with mobile phase solvent. Analysis 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. 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.
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.
Preparation for PFAS in water.	EP231-PR	WATER	Method presumes direct injection without workup. Preparation includes addition of internal standard and surrogate, and filtration prior to analysis.

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

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Sample Receipt Advice

Company name:	GHD Pty Ltd SA
Contact name:	Angus Robinson
Project name:	MFS CAMDEN PARK DSI
Project ID:	12616802
Turnaround time:	5 Day
Date/Time received	Oct 20, 2023 9:00 AM
Eurofins reference	1036822

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Amy Meunier on phone : or by email: AmyMeunier@eurofins.com

Results will be delivered electronically via email to Angus Robinson - angus.robinson@ghd.com.

Note: A copy of these results will also be delivered to the general GHD Pty Ltd SA email address.



Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

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Auckland	Christchurch	Tauranga
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web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Company Name:	GHD Pty Ltd SA	Order No.:		Received:	Oct 20, 2023 9:00 AM
Address:	GPO Box 2052 Adelaide SA 5001	Report #:	1036822	Due:	Oct 27, 2023
		Phone:	08 8111 6600	Priority:	5 Day
		Fax:	08 8111 6699	Contact Name:	Angus Robinson
Project Name:	MFS CAMDEN PARK DSI				
Project ID:	12616802				

Eurofins Analytical Services Manager : Amy Meunier

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	FS01	Oct 16, 2023		Soil	M23-Oc0047115	X	X
2	FS02	Oct 16, 2023		Soil	M23-Oc0047116	X	X
3	FS04	Oct 17, 2023		Soil	M23-Oc0047117	X	X
4	FS05	Oct 17, 2023		Soil	M23-Oc0047118	X	X
Test Counts						4	4

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: Angus Robinson

Report 1036822-S
Project name MFS CAMDEN PARK DSI
Project ID 12616802
Received Date Oct 20, 2023

Client Sample ID			FS01	FS02	FS04	FS05
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M23- Oc0047115	M23- Oc0047116	M23- Oc0047117	M23- Oc0047118
Date Sampled			Oct 16, 2023	Oct 16, 2023	Oct 17, 2023	Oct 17, 2023
Test/Reference	LOR	Unit				
Sample Properties						
% Moisture	1	%	6.4	3.1	4.9	5.2
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA) ^{N11}	5	ug/kg	< 5	< 5	< 5	5.6
Perfluoropentanoic acid (PFPeA) ^{N11}	5	ug/kg	< 5	< 5	< 5	7.9
Perfluorohexanoic acid (PFHxA) ^{N11}	5	ug/kg	< 5	< 5	< 5	38
Perfluoroheptanoic acid (PFHpA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanoic acid (PFOA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorononanoic acid (PFNA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorodecanoic acid (PFDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoroundecanoic acid (PFUnDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorododecanoic acid (PFDoDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorotridecanoic acid (PFTTrDA) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
13C4-PFBA (surr.)	1	%	88	90	86	88
13C5-PFPeA (surr.)	1	%	101	104	96	93
13C5-PFHxA (surr.)	1	%	104	116	109	100
13C4-PFHpA (surr.)	1	%	102	104	96	106
13C8-PFOA (surr.)	1	%	104	119	114	124
13C5-PFNA (surr.)	1	%	130	142	122	120
13C6-PFDA (surr.)	1	%	103	106	104	108
13C2-PFUnDA (surr.)	1	%	142	144	132	128
13C2-PFDoDA (surr.)	1	%	122	122	117	117
13C2-PFTeDA (surr.)	1	%	115	103	127	115
Perfluoroalkyl sulfonamido substances						
Perfluorooctane sulfonamide (FOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	FS01 Soil M23- Oc0047115 Oct 16, 2023	FS02 Soil M23- Oc0047116 Oct 16, 2023	FS04 Soil M23- Oc0047117 Oct 17, 2023	FS05 Soil M23- Oc0047118 Oct 17, 2023
Perfluoroalkyl sulfonamido substances						
13C8-FOSA (surr.)	1	%	96	107	94	97
D3-N-MeFOSA (surr.)	1	%	115	116	113	114
D5-N-EtFOSA (surr.)	1	%	132	120	137	136
D7-N-MeFOSE (surr.)	1	%	98	102	97	100
D9-N-EtFOSE (surr.)	1	%	82	69	101	102
D5-N-EtFOSAA (surr.)	1	%	126	133	131	102
D3-N-MeFOSAA (surr.)	1	%	126	129	138	108
Perfluoroalkyl sulfonic acids (PFSA's)						
Perfluorobutanesulfonic acid (PFBS) ^{N11}	5	ug/kg	< 5	< 5	< 5	^{N09} 16
Perfluorononanesulfonic acid (PFNS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	5	ug/kg	< 5	< 5	< 5	8.4
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	5	ug/kg	< 5	< 5	< 5	^{N09} 6.5
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	5	ug/kg	< 5	< 5	< 5	^{N09} 6.4
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS) ^{N11}	5	ug/kg	^{N09} 6.1	< 5	< 5	< 5
Perfluorodecanesulfonic acid (PFDS) ^{N15}	5	ug/kg	< 5	< 5	< 5	< 5
13C3-PFBS (surr.)	1	%	118	117	116	109
18O2-PFHxS (surr.)	1	%	102	105	99	102
13C8-PFOS (surr.)	1	%	88	81	85	93
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	10	ug/kg	< 10	< 10	< 10	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5	< 5
13C2-4:2 FTSA (surr.)	1	%	93	98	112	108
13C2-6:2 FTSA (surr.)	1	%	97	96	100	199
13C2-8:2 FTSA (surr.)	1	%	110	116	113	112
13C2-10:2 FTSA (surr.)	1	%	112	109	142	86
PFASs Summations						
Sum (PFHxS + PFOS)*	5	ug/kg	6.1	< 5	< 5	6.4
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	6.1	< 5	< 5	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	6.1	< 5	< 5	6.4
Sum of WA DWER PFAS (n=10)*	10	ug/kg	< 10	< 10	< 10	73.9
Sum of PFASs (n=30)*	50	ug/kg	< 50	< 50	< 50	88.8

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	Oct 20, 2023	14 Days
- Method: LTM-GEN-7080 Moisture			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Oct 24, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Oct 24, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Oct 24, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Oct 24, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Oct 20, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
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Company Name: GHD Pty Ltd SA
Address: GPO Box 2052
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Project Name: MFS CAMDEN PARK DSI
Project ID: 12616802

Order No.:
Report #: 1036822
Phone: 08 8111 6600
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Received: Oct 20, 2023 9:00 AM
Due: Oct 27, 2023
Priority: 5 Day
Contact Name: Angus Robinson

Eurofins Analytical Services Manager : Amy Meunier

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	FS01	Oct 16, 2023		Soil	M23-Oc0047115	X	X
2	FS02	Oct 16, 2023		Soil	M23-Oc0047116	X	X
3	FS04	Oct 17, 2023		Soil	M23-Oc0047117	X	X
4	FS05	Oct 17, 2023		Soil	M23-Oc0047118	X	X
Test Counts						4	4

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. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
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.
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 date of sampling; 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 7 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	µg/L: micrograms per litre
ppm: parts per million	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		

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 like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -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 5.4
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 be used as a guide only 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%

PFAS field samples that contain surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported, have been 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 (PFTTrDA)	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 (PFASs)							
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 FTSA)							
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)	%	83			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	65			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	87			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	83			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	85			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	88			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	78			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	80			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	96			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	76			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	82			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	91			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	87			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	84			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	84			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	85			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	82			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	87			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)									
Perfluorobutanesulfonic acid (PFBS)			%	73			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	90			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	82			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	74			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	79			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	86			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	80			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	73			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	77			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	85			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	79			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	77			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)		M23-Oc0047116	CP	%	91		50-150	Pass	
Perfluoropentanoic acid (PFPeA)		M23-Oc0047116	CP	%	78		50-150	Pass	
Perfluorohexanoic acid (PFHxA)		M23-Oc0047116	CP	%	96		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)		M23-Oc0047116	CP	%	90		50-150	Pass	
Perfluorooctanoic acid (PFOA)		M23-Oc0047116	CP	%	90		50-150	Pass	
Perfluorononanoic acid (PFNA)		M23-Oc0047116	CP	%	98		50-150	Pass	
Perfluorodecanoic acid (PFDA)		M23-Oc0047116	CP	%	93		50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)		M23-Oc0047116	CP	%	86		50-150	Pass	
Perfluorododecanoic acid (PFDoDA)		M23-Oc0047116	CP	%	98		50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)		M23-Oc0047116	CP	%	85		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)		M23-Oc0047116	CP	%	94		50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)		M23-Oc0047116	CP	%	97		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)		M23-Oc0047116	CP	%	98		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)		M23-Oc0047116	CP	%	89		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)		M23-Oc0047116	CP	%	92		50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)		M23-Oc0047116	CP	%	89		50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Oc0047116	CP	%	88			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Oc0047116	CP	%	89			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-Oc0047116	CP	%	75			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Oc0047116	CP	%	91			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Oc0047116	CP	%	81			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Oc0047116	CP	%	71			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Oc0047116	CP	%	90			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Oc0047116	CP	%	86			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Oc0047116	CP	%	78			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Oc0047116	CP	%	77			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Oc0047116	CP	%	85			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Oc0047116	CP	%	95			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Oc0047116	CP	%	87			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Oc0047116	CP	%	89			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	M23-Oc0048199	NCP	%	21	22	6.9	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTeDA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Oc0047115	CP	ug/kg	< 10	< 10	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Oc0047115	CP	ug/kg	< 10	< 10	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M23-Oc0047115	CP	ug/kg	6.1	5.3	14	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Oc0047115	CP	ug/kg	< 10	< 10	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Oc0047115	CP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Oc0047115	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
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:

Harry Bacalis	Analytical Services Manager
Joseph Edouard	Senior Analyst-PFAS
Mary Makarios	Senior Analyst-Sample Properties



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](#).

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Rebatch

Client / Client code: GHDSER

Project: MFS CAMDEN PARK DSI

Project Manger: ANGUS ROBINSON

Date /time sample rec: 18/10/2023 12:50

Date/time Instructions rec: 31/10/2023 10:17

Due date: Tuesday, 7 November 2023

Due date surcharge: STANDARD

CS Contact: Peter Ravlic/RU

Additional Information:

Report recipients:ANGUS R,
BEN P, ELOOSELVY G, GHD
LABREPORTS,TERRENCE W

Environmental Division
Melbourne

Work Order Reference

EM2319478



Telephone : + 61-3-8549 9600

[illegible]



CERTIFICATE OF ANALYSIS

Work Order	: EM2319478	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: ANGUS ROBINSON	Contact	: Kieren Burns
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: MFS CAMDEN PARK DSI	Date Samples Received	: 18-Oct-2023 12:20
Order number	: ----	Date Analysis Commenced	: 31-Oct-2023
C-O-C number	: ----	Issue Date	: 06-Nov-2023 16:23
Sampler	: ----		
Site	: ----		
Quote number	: EM23GHDSER0022		
No. of samples received	: 2		
No. of samples analysed	: 2		



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
Xing Lin	Senior Organic Chemist	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: Poor matrix spike recovery for sample EM2319137-005 due to sample matrix interference.
- This is a rebatch of EM2318553.
- 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.



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH05_1.0-1.15	BH06_1.2-1.3	----	----	----
Sampling date / time					16-Oct-2023 00:00	16-Oct-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2319478-001	EM2319478-002	-----	-----	-----
					Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	0.1	%		16.6	13.0	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg		<0.0002	0.0008	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg		0.0011	0.0057	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg		<0.001	<0.001	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg		<0.0002	0.0005	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH05_1.0-1.15	BH06_1.2-1.3	----	----	----
Sampling date / time					16-Oct-2023 00:00	16-Oct-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2319478-001	EM2319478-002	-----	-----	-----
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<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	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		0.0011	0.0070	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0011	0.0065	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0011	0.0070	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		112	107	----	----	----
13C8-PFOA	----	0.0002	%		102	93.8	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EM2319478	Page	: 1 of 7
Client	: GHD PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: ANGUS ROBINSON	Contact	: Kieren Burns
Address	: Level 4, 211 VICTORIA SQUARE ADELAIDE SA, AUSTRALIA 5000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61881625130
Project	: MFS CAMDEN PARK DSI	Date Samples Received	: 18-Oct-2023
Order number	: ----	Date Analysis Commenced	: 31-Oct-2023
C-O-C number	: ----	Issue Date	: 06-Nov-2023
Sampler	: ----		
Site	: ----		
Quote number	: EM23GHDSE0022		
No. of samples received	: 2		
No. of samples analysed	: 2		



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
Xing Lin	Senior Organic Chemist	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

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**

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: 5395808)									
EM2319478-001	BH05_1.0-1.15	EA055: Moisture Content	----	0.1	%	16.6	15.8	5.2	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 5399197)									
EM2318930-005	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	<0.0002	<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
EM2319478-001	BH05_1.0-1.15	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	0.0011	0.0012	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: 5399197)									
EM2318930-005	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	<0.0002	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

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: 5399197) - continued									
EM2318930-005	Anonymous	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
EM2319478-001	BH05_1.0-1.15	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 (PFTTrDA)	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: 5399197)							
EM2318930-005	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
EM2319478-001	BH05_1.0-1.15	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: 5399197)									



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 (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5399197) - continued									
EM2318930-005	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
EM2319478-001	BH05_1.0-1.15	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: 5399197)									
EM2318930-005	Anonymous	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
EM2319478-001	BH05_1.0-1.15	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0011	0.0012	8.7	No Limit
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0011	0.0012	8.7	No Limit
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0011	0.0012	8.7	No Limit

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)		
		LCS	Low	High	
Result					
<0.0002	0.00111 mg/kg	88.8	72.0	128	
<0.0002	0.00118 mg/kg	74.1	73.0	123	
<0.0002	0.00114 mg/kg	89.6	67.0	130	
<0.0002	0.00119 mg/kg	113	70.0	132	
<0.0002	0.00116 mg/kg	92.9	68.0	136	
<0.0002	0.00121 mg/kg	93.8	59.0	134	
<0.001	0.00625 mg/kg	79.8	71.0	135	
<0.0002	0.00125 mg/kg	94.6	69.0	132	
<0.0002	0.00125 mg/kg	89.6	70.0	132	
<0.0002	0.00125 mg/kg	97.4	71.0	131	
<0.0002	0.00125 mg/kg	92.9	69.0	133	
<0.0002	0.00125 mg/kg	107	72.0	129	
<0.0002	0.00125 mg/kg	96.8	69.0	133	
<0.0002	0.00125 mg/kg	98.9	64.0	136	
<0.0002	0.00125 mg/kg	86.8	69.0	135	
<0.0002	0.00125 mg/kg	77.3	66.0	139	
<0.0005	0.00312 mg/kg	96.7	69.0	133	
<0.0002	0.00125 mg/kg	99.3	67.0	137	
<0.0005	0.00312 mg/kg	108	70.0	130	
<0.0005	0.00312 mg/kg	80.6	70.0	130	
<0.0005	0.00312 mg/kg	118	70.0	130	
<0.0005	0.00312 mg/kg	97.3	70.0	130	
<0.0002	0.00125 mg/kg	79.1	63.0	144	
<0.0002	0.00125 mg/kg	79.1	61.0	139	



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5399197) - continued								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	97.5	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	96.6	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	99.1	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	80.5	70.0	130
EP231P: PFAS Sums (QCLot: 5399197)								
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				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5399197)							
EM2319137-005	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	105	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	74.9	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	# 42.6	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	105	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	# 41.7	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5399197)							
EM2319137-005	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	76.6	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	# 67.9	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	79.5	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	73.7	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	85.2	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	97.4	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	86.7	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	95.1	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	92.3	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.00125 mg/kg	138	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	90.5	69.0	133



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5399197)							
EM2319137-005	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	82.2	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	110	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	82.3	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	97.9	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	76.7	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	67.6	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	68.6	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5399197)							
EM2319137-005	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	85.9	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00119 mg/kg	100	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	116	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00121 mg/kg	# Not Determined	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order : EM2319478

Page : 1 of 5

Client : GHD PTY LTD
Contact : ANGUS ROBINSON
Project : MFS CAMDEN PARK DSI
Site : ----
Sampler : ----
Order number : ----

Laboratory : Environmental Division Melbourne
Telephone : +61881625130
Date Samples Received : 18-Oct-2023
Issue Date : 06-Nov-2023
No. of samples received : 2
No. of samples analysed : 2

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, **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	EM2319137--005	Anonymous	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	42.6 %	67.0-130%	Recovery less than lower data quality objective
EP231A: Perfluoroalkyl Sulfonic Acids	EM2319137--005	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EM2319137--005	Anonymous	Perfluorodecane sulfonic acid (PFDS)	335-77-3	41.7 %	59.0-134%	Recovery less than lower data quality objective
EP231B: Perfluoroalkyl Carboxylic Acids	EM2319137--005	Anonymous	Perfluoropentanoic acid (PFPeA)	2706-90-3	67.9 %	69.0-132%	Recovery less than lower data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method			Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content (Dried @ 105-110°C)								
HDPE Soil Jar BH05_1.0-1.15,								

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	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055) BH05_1.0-1.15, BH06_1.2-1.3	16-Oct-2023	----	----	----	31-Oct-2023	30-Oct-2023	✖
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X) BH05_1.0-1.15, BH06_1.2-1.3	16-Oct-2023	02-Nov-2023	13-Apr-2024	✔	06-Nov-2023	12-Dec-2023	✔

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) BH05_1.0-1.15, BH06_1.2-1.3		16-Oct-2023	02-Nov-2023	13-Apr-2024	✓	06-Nov-2023	12-Dec-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) BH05_1.0-1.15, BH06_1.2-1.3		16-Oct-2023	02-Nov-2023	13-Apr-2024	✓	06-Nov-2023	12-Dec-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) BH05_1.0-1.15, BH06_1.2-1.3		16-Oct-2023	02-Nov-2023	13-Apr-2024	✓	06-Nov-2023	12-Dec-2023	✓
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) BH05_1.0-1.15, BH06_1.2-1.3		16-Oct-2023	02-Nov-2023	13-Apr-2024	✓	06-Nov-2023	12-Dec-2023	✓



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	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	17	5.88	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 5.3, 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.

ALS Laboratory:
please click →

CLIENT: GHD

OFFICE: Adelaide

TURNAROUND REQUIREMENTS :

☒ Standard TAT (List due date):

(Standard TAT may be longer for some tests e.g., Ultra Trace Organics)

☐ Non Standard or urgent TAT (List due date):

ALS QUOTE:

ORDER NO.: 12616802

PROJECT: MFS CAMDEN PARK DSI

PROJECT MANAGER: Angus Robinson

CONTACT PH: 0431 177 498

SAMPLER: AK (Ally Kirkman)

SAMPLER MOBILE: 0412 625 108

RELINQUISHED BY:

Ally Kirkman

RECEIVED BY:

RELINQUISHED BY:

RECEIVED BY:

COC emailed to ALS? YES

EDD FORMAT (or default): Esdat

DATE/TIME: 24 October 2023: 14:30

DATE/TIME: 24 October 2023: 14:30

DATE/TIME:

DATE/TIME:

Email Invoice to: Angus.Robinson@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 <i>(refer to codes below)</i>	TOTAL CONTAINERS	PFAS (Long Suite) - Standard LOR											Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	MW01	24/10/2023	W	P	1	x											
2	MW02	24/10/2023	W	P	1	x											
3	MW03	24/10/2023	W	P	1	x											
4	FD01	24/10/2023	W	P	1	x											
→	FS01	24/10/2023	W	P	1	x	Please forward to Eurofins										
5	FB01	24/10/2023	W	P	1	x											
6	RB01	24/10/2023	W	P	1	x											

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 Solis; B = Unpreserved Bag.



CERTIFICATE OF ANALYSIS

Work Order : EM2319054
Client : GHD PTY LTD
Contact : ANGUS ROBINSON
Address : Level 4, 211 VICTORIA SQUARE
ADELAIDE SA, AUSTRALIA 5000
Telephone : ----
Project : MFS CAMDEN PARK DSI
Order number : ----
C-O-C number : ----
Sampler : AK
Site : ----
Quote number : MEBQ/005/21 (Vic Only, Primary)
No. of samples received : 6
No. of samples analysed : 6

Page : 1 of 7
Laboratory : Environmental Division Melbourne
Contact : Peter Ravlic
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +6138549 9645
Date Samples Received : 25-Oct-2023 10:25
Date Analysis Commenced : 26-Oct-2023
Issue Date : 27-Oct-2023 15:51



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
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 QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- 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.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW01	MW02	MW03	FD01	FB01
Sampling date / time				24-Oct-2023 00:00	24-Oct-2023 00:00	24-Oct-2023 00:00	24-Oct-2023 00:00	24-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2319054-001	EM2319054-002	EM2319054-003	EM2319054-004	EM2319054-005
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.16	0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.16	0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	0.08	0.05	0.64	0.22	<0.01
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.06	0.04	0.04	0.30	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<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	0.04	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.19	0.03	<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	0.02	0.02	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<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	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW01	MW02	MW03	FD01	FB01
Sampling date / time				24-Oct-2023 00:00	24-Oct-2023 00:00	24-Oct-2023 00:00	24-Oct-2023 00:00	24-Oct-2023 00:00
Compound	CAS Number	LOR	Unit	EM2319054-001	EM2319054-002	EM2319054-003	EM2319054-004	EM2319054-005
				Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<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	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<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	0.14	0.09	1.27	0.61	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.14	0.09	0.68	0.52	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.14	0.09	1.11	0.59	<0.01
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	108	110	111	101	109
13C8-PFOA	----	0.02	%	99.4	98.0	96.3	102	98.7



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				RB01	----	----	----	----
Sampling date / time				24-Oct-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2319054-006	-----	-----	-----	-----
				Result	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----
Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	RB01	----	----	----	----
Sampling date / time					24-Oct-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2319054-006	-----	-----	-----	-----
					Result	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<0.05	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L		<0.05	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<0.02	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L		<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	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<0.05	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L		<0.05	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	----	----	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		107	----	----	----	----
13C8-PFOA	----	0.02	%		98.9	----	----	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EM2319054	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: ANGUS ROBINSON	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	: MFS CAMDEN PARK DSI	Date Samples Received	: 25-Oct-2023
Order number	: ----	Date Analysis Commenced	: 26-Oct-2023
C-O-C number	: ----	Issue Date	: 27-Oct-2023
Sampler	: AK		
Site	: ----		
Quote number	: MEBQ/005/21 (Vic Only, Primary)		
No. of samples received	: 6		
No. of samples analysed	: 6		



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
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

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**

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: 5384451)									
EM2319006-102	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: 5384451)									
EM2319006-102	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 (PFTriDA)	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: 5384451)									
EM2319006-102	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

Page : 3 of 6
 Work Order : EM2319054
 Client : GHD PTY LTD
 Project : MFS CAMDEN PARK DSI



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: 5384451) - continued									
EM2319006-102	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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 5384451)									
EM2319006-102	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: 5384451)									
EM2319006-102	Anonymous	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

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.

Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
	Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)		
		LCS	Low	High	
Result					
<0.02	0.222 µg/L	89.0	72.0	130	
<0.02	0.235 µg/L	96.5	71.0	127	
<0.01	0.228 µg/L	92.7	68.0	131	
<0.02	0.238 µg/L	86.6	69.0	134	
<0.01	0.232 µg/L	108	65.0	140	
<0.02	0.241 µg/L	93.4	53.0	142	
<0.1	1.25 µg/L	80.2	73.0	129	
<0.02	0.25 µg/L	77.2	72.0	129	
<0.02	0.25 µg/L	82.0	72.0	129	
<0.02	0.25 µg/L	88.7	72.0	130	
<0.01	0.25 µg/L	90.2	71.0	133	
<0.02	0.25 µg/L	90.8	69.0	130	
<0.02	0.25 µg/L	85.0	71.0	129	
<0.02	0.25 µg/L	96.6	69.0	133	
<0.02	0.25 µg/L	81.4	72.0	134	
<0.02	0.25 µg/L	74.5	65.0	144	
<0.05	0.625 µg/L	90.9	71.0	132	
<0.02	0.25 µg/L	91.5	67.0	137	
<0.05	0.625 µg/L	95.9	68.0	141	
<0.05	0.625 µg/L	101	70.0	130	
<0.05	0.625 µg/L	84.8	70.0	130	
<0.05	0.625 µg/L	94.3	70.0	130	
<0.02	0.25 µg/L	85.2	65.0	136	
<0.02	0.25 µg/L	84.7	61.0	135	

Matrix Spike (MS) Report

Sub-Matrix: WATER

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 5384451)							
EM2319054-001	MW01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.222 µg/L	81.9	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.235 µg/L	85.3	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.228 µg/L	90.2	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.238 µg/L	88.2	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.232 µg/L	125	65.0	140
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.241 µg/L	97.9	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 5384451)							
EM2319054-001	MW01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	84.5	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	80.0	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	86.3	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	88.5	72.0	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.25 µg/L	90.3	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	91.2	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	86.1	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	89.1	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	85.0	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	77.2	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	92.1	71.0	132
		EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5384451)					



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 5384451) - continued							
EM2319054-001	MW01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	92.2	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	91.4	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	98.9	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	87.7	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	93.5	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	82.8	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	91.6	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 5384451)							
EM2319054-001	MW01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.234 µg/L	84.1	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.238 µg/L	86.7	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.24 µg/L	97.5	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.242 µg/L	86.4	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EM2319054**

Page : 1 of 4

Client : **GHD PTY LTD**
Contact : **ANGUS ROBINSON**
Project : **MFS CAMDEN PARK DSI**
Site : **----**
Sampler : **AK**
Order number : **----**

Laboratory : **Environmental Division Melbourne**
Telephone : **+6138549 9645**
Date Samples Received : **25-Oct-2023**
Issue Date : **27-Oct-2023**
No. of samples received : **6**
No. of samples analysed : **6**

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, **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.

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.

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: **x** = Holding time breach : **✓** = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
MW01, MW03, FB01, MW02, FD01, RB01	24-Oct-2023	26-Oct-2023	21-Apr-2024	✓	26-Oct-2023	21-Apr-2024	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X)							
MW01, MW03, FB01, MW02, FD01, RB01	24-Oct-2023	26-Oct-2023	21-Apr-2024	✓	26-Oct-2023	21-Apr-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X)							
MW01, MW03, FB01, MW02, FD01, RB01	24-Oct-2023	26-Oct-2023	21-Apr-2024	✓	26-Oct-2023	21-Apr-2024	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X)							
MW01, MW03, FB01, MW02, FD01, RB01	24-Oct-2023	26-Oct-2023	21-Apr-2024	✓	26-Oct-2023	21-Apr-2024	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X)							
MW01, MW03, FB01, MW02, FD01, RB01	24-Oct-2023	26-Oct-2023	21-Apr-2024	✓	26-Oct-2023	21-Apr-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: **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	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	10	10.00	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
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 5.3, table B-15 requirements.
Preparation Methods	Method	Matrix	Method Descriptions
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.

RELINQUISHED BY SR (ALS), 25/10/2023

CLIENT: GHD

OFFICE: Adelaide

TURNAROUND REQUIREMENTS :

TURNAROUND REQUIREMENTS: ☒ Standard TAT (List due date):

(Standard IAT may be longer for some tests e.g.,
Ultra Trace Organics)

ALS QUOTE:

ORDER NO.: 12616802

PROJECT: MFS CAMDEN PARK DSI

PROJECT MANAGER: Angus Robinson

CONTACT PH: 0431 177 498

SAMPLER: AK (Ailly Kirkman)

SAMPLER MOBILE: 0412 625 108

COC emailed to ALS? YES

EDD FORMAT (or default): Esdat

Email Reports to: Angus.Robinson@ghd.com; ally.kirkman@ghd.com; Ben.Petticrew@ghd.com; GHDLabReports@ghd.com

RELINQUISHED BY:

Ally Kirkman

DATE/TIME: 24 October 2023; 14:30

RECEIVED BY:

DATE/TIME: 24 October 2023: 14:30

RELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

DATE/TIME:

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 (Long Suite) - Standard LOR	Additional information									
1	MW01	24/10/2023	W	P	1	x	Comments on likely contaminant levels, dilutions, or samples requiring specific OC analysis etc.									
2	MW02	24/10/2023	W	P	1	x										
3	MW03	24/10/2023	W	P	1	x										
4	FD01	24/10/2023	W	P	1	x										
5	FS01	24/10/2023	W	P	1	x										
6	FB01	24/10/2023	W	P	1	x										
	RB01	24/10/2023	W	P	1	x	Please forward to Eurofins									

Environmental Division
Melbourne
Work Order Reference
EM2319054

DATE: 26/10/23
TIME: 4pm
COURIER:
TEMPERATURE 10.3
ATTEMP TO CHILL: YES

NO Telephone : + 61-3-8549 9600

Environmental Division
Melbourne
Work Order Reference
EM2319054



NO 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 - Airflight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airflight 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.

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland	Christchurch	Tauranga
35 O'Rourke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Sample Receipt Advice

Company name:	GHD Pty Ltd SA
Contact name:	Angus Robinson
Project name:	MFS CAMDEN PARK DSI
Project ID:	Not provided
Turnaround time:	5 Day
Date/Time received	Oct 26, 2023 9:00 AM
Eurofins reference	1038556

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Amy Meunier on phone : or by email: AmyMeunier@eurofins.com

Results will be delivered electronically via email to Angus Robinson - angus.robinson@ghd.com.

Note: A copy of these results will also be delivered to the general GHD Pty Ltd SA email address.



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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne 6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Company Name:	GHD Pty Ltd SA	Order No.:	12616802	Received:	Oct 26, 2023 9:00 AM
Address:	GPO Box 2052 Adelaide SA 5001	Report #:	1038556	Due:	Nov 2, 2023
		Phone:	08 8111 6600	Priority:	5 Day
		Fax:	08 8111 6699	Contact Name:	Angus Robinson
Project Name:	MFS CAMDEN PARK DSI				
Eurofins Analytical Services Manager : Amy Meunier					

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	FS01	Oct 24, 2023		Water	M23-Oc0063760	X
Test Counts						1

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: Angus Robinson

Report 1038556-W
Project name MFS CAMDEN PARK DSI
Received Date Oct 26, 2023

Client Sample ID			FS01
Sample Matrix			Water
Eurofins Sample No.			M23- Oc0063760
Date Sampled			Oct 24, 2023
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	0.03
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	^{N09} 0.02
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	84
13C5-PFPeA (surr.)	1	%	122
13C5-PFHxA (surr.)	1	%	125
13C4-PFHpA (surr.)	1	%	127
13C8-PFOA (surr.)	1	%	144
13C5-PFNA (surr.)	1	%	114
13C6-PFDA (surr.)	1	%	102
13C2-PFUnDA (surr.)	1	%	123
13C2-PFDoDA (surr.)	1	%	134
13C2-PFTeDA (surr.)	1	%	81
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	111
D3-N-MeFOSA (surr.)	1	%	81
D5-N-EtFOSA (surr.)	1	%	72

Client Sample ID			FS01
Sample Matrix			Water
Eurofins Sample No.			M23- Oc0063760
Date Sampled			Oct 24, 2023
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonamido substances			
D7-N-MeFOSE (surr.)	1	%	88
D9-N-EtFOSE (surr.)	1	%	87
D5-N-EtFOSAA (surr.)	1	%	107
D3-N-MeFOSAA (surr.)	1	%	127
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	^{N09} 0.02
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	^{N09} 0.03
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	^{N09} 0.22
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	^{N09} 0.02
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.52
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	127
18O2-PFHxS (surr.)	1	%	125
13C8-PFOS (surr.)	1	%	112
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	102
13C2-6:2 FTSA (surr.)	1	%	101
13C2-8:2 FTSA (surr.)	1	%	150
13C2-10:2 FTSA (surr.)	1	%	138
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.74
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.54
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.76
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	0.81
Sum of PFASs (n=30)*	0.1	ug/L	0.86

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
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Oct 27, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Oct 27, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Oct 27, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Oct 27, 2023	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Oct 26, 2023	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			



Melbourne 6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 Tel: +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1, 2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 20794	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079 & 25289

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

Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 4551 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 Tel: +64 9 525 0568 IANZ# 1402

Company Name:	GHD Pty Ltd SA	Order No.:	12616802	Received:	Oct 26, 2023 9:00 AM
Address:	GPO Box 2052 Adelaide SA 5001	Report #:	1038556	Due:	Nov 2, 2023
		Phone:	08 8111 6600	Priority:	5 Day
		Fax:	08 8111 6699	Contact Name:	Angus Robinson
Project Name:	MFS CAMDEN PARK DSI				
Eurofins Analytical Services Manager : Amy Meunier					

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	FS01	Oct 24, 2023		Water	M23-Oc0063760	
Test Counts						1

Internal Quality Control Review and Glossary

General

- 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.
- All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
- For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
- Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
- 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 date of sampling; 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 7 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	µg/L: micrograms per litre
ppm: parts per million	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		

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 like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -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 5.4
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 be used as a guide only 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%

PFAS field samples that contain surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported, have been reviewed, and no data was affected.

QC Data General Comments

- 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.
- 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.
- 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.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
- 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/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA's)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	77			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	85			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	77			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	72			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	71			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	87			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	77			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	77			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	80			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	67			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	87			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	86			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	86			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	78			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	64			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	86			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	79			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	87			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	77			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	81			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	84			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	75			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	75			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	81			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	78			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	77			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	75			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	85			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	82			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	94			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)	M23-Oc0057799	NCP	%	74			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Oc0057799	NCP	%	74			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Oc0057799	NCP	%	74			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Oc0057799	NCP	%	71			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M23-Oc0057799	NCP	%	70			50-150	Pass	
Perfluorononanoic acid (PFNA)	M23-Oc0057799	NCP	%	86			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M23-Oc0057799	NCP	%	75			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Oc0057799	NCP	%	73			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Oc0057799	NCP	%	77			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Oc0057799	NCP	%	62			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Oc0057799	NCP	%	81			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	M23-Oc0057799	NCP	%	77			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M23-Oc0057799	NCP	%	85			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M23-Oc0057799	NCP	%	68			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M23-Oc0057799	NCP	%	63			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M23-Oc0057799	NCP	%	77			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M23-Oc0057799	NCP	%	74			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M23-Oc0057799	NCP	%	77			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M23-Oc0057799	NCP	%	73			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M23-Oc0057799	NCP	%	74			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M23-Oc0057799	NCP	%	68			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M23-Oc0057799	NCP	%	75			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M23-Oc0057799	NCP	%	73			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M23-Oc0057799	NCP	%	72			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M23-Oc0057799	NCP	%	75			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M23-Oc0057799	NCP	%	70			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M23-Oc0057799	NCP	%	73			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M23-Oc0057799	NCP	%	86			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M23-Oc0057799	NCP	%	74			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M23-Oc0057799	NCP	%	76			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M23-Oc0063760	CP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M23-Oc0063760	CP	ug/L	0.03	0.03	1.9	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M23-Oc0063760	CP	ug/L	0.02	0.02	4.2	30%	Pass	
Perfluorononanoic acid (PFNA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M23-Oc0063760	CP	ug/L	< 0.01	< 0.01	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	L23-Oc0050381	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	L23-Oc0050381	NCP	ug/L	< 0.01	< 0.01	<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:

Amy Meunier 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](#).

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Appendix H

Tabulated Analytical Tables



Table 1
Groundwater Exceedances

MFS

MFS Camden Park DSI

	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids												PFAS - Perfluoroalkyl			
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)		
EQL	0.02	0.02	0.01	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.05	0.05		
ADWG 2011 Health (v3.7 updated 2022)											0.56											
ADWG 2011 Recreational (v3.7 updated 2022)											5.6											
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											
Field ID	Date	Lab Report Number																				
MW01	24 Oct 2023	EM2319054	<0.02	<0.02	0.08	<0.02	0.06	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05
MW02	24 Oct 2023	EM2319054	<0.02	<0.02	0.05	<0.02	0.04	<0.02	<0.1	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05
MW03	24 Oct 2023	EM2319054	0.16	0.16	0.64	<0.02	0.04	<0.02	<0.1	0.04	0.19	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05

Environmental Standards
National Health and Medical Research Council, January 2022, ADWG 2011 Health (v3.7 updated 2022)
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



Table 1
Groundwater Exceedances

MFS

MFS Camden Park DSI

	PFAS - Perfluoroalkyl Sulfonamide				PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums		
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFHxS and PFOS	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.02	0.05	0.05	0.02	0.05	0.05	0.05	0.05	0.01	0.01	0.01
ADWG 2011 Health (v3.7 updated 2022)									0.07		
ADWG 2011 Recreational (v3.7 updated 2022)									0.7		
PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems											
PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems											

Field ID	Date	Lab Report Number											
MW01	24 Oct 2023	EM2319054	<0.02	<0.05	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	0.14	0.14	0.14
MW02	24 Oct 2023	EM2319054	<0.02	<0.05	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	0.09	0.09	0.09
MW03	24 Oct 2023	EM2319054	<0.02	<0.05	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	0.68	1.27	1.11

Environmental Standards
National Health and Medical Research Council, January 2022, ADWG :
National Health and Medical Research Council, January 2022, ADWG :
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to n
HEPA, January 2020, PFAS NEMP 2.0 2020 Freshwater - 99% - high cc



Table 4
Rinsate Results

MFS

MFS Camden Park DSI

	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids											PFAS - Perfluoroalkyl			
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	0.02	0.02	0.01	0.02	0.01	0.02	0.1	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.05	0.05	
Field ID	Date	Lab Report Number																			
RB01	17 Oct 2023	EM2318553																			
RB02	17 Oct 2023	EM2318553																			
		<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.10	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05
		<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.10	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05



Table 4
Rinsate Results

MFS

MFS Camden Park DSI

EQL	PFAS - Perfluoroalkyl Sulfonamide				PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums		
	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFHxS and PFOS	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	0.02	0.05	0.05	0.02	0.05	0.05	0.05	0.05	0.01	0.01	0.01

Field ID	Date	Lab Report Number											
RB01	17 Oct 2023	EM2318553	<0.02	<0.05	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01
RB02	17 Oct 2023	EM2318553	<0.02	<0.05	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01



Table 3
RPD Exceedances

MFS

MFS Camden Park DSI

				PFAS - Perfluoroalkyl Sulfonic Acids							PFAS - Perfluoroalkyl Carboxylic Acids										PFAS -
				Perfluoropropanesulfonic acid (PFPrS)	Perfluorobutanesulfonic acid (PFBS)	Perfluoropentanesulfonic acid (PFPeS)	Perfluorohexanesulfonic acid (PFHxS)	Perfluoroheptanesulfonic acid (PFHpS)	Perfluorooctanesulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005
Location Code	Sample Type	Date	Lab Report Number																		
BH03	Normal	16 Oct 2023	EM2318553	-	<0.0002	<0.0002	0.0002	<0.0002	0.0018	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Field_D	17 Oct 2023	EM2318553	-	<0.0002	<0.0002	0.0002	<0.0002	0.0067	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
RPD				-	0	0	0	0	115	0	0	0	0	0	0	0	0	0	0	0	0
BH03	Normal	16 Oct 2023	EM2318553	-	<0.0002	<0.0002	0.0002	<0.0002	0.0018	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Interlab_D	16 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.005	<0.005	0.0061	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
RPD				-	0	0	0	0	109	0	0	0	0	0	0	0	0	0	0	0	0
BH06	Normal	16 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0052	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Field_D	17 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0039	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
RPD				-	0	0	0	0	29	0	0	0	0	0	0	0	0	0	0	0	0
BH06	Normal	16 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0052	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Interlab_D	16 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
RPD				-	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
BH08	Normal	16 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0007	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Field_D	17 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
RPD				-	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0
BH08	Normal	16 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0007	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Field_D	17 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
RPD				-	0	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0
MW01	Normal	17 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0023	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Field_D	17 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0014	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
RPD				-	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0
MW01	Normal	17 Oct 2023	EM2318553	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0023	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Interlab_D	17 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
RPD				-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MW01	Normal	17 Oct 2023	EM2318553	-	0.0152	0.0063	0.0066	0.0003	0.0031	<0.0002	0.004	0.0073	0.0272	0.0008	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Field_D	17 Oct 2023	EM2318553	-	0.0128	0.0055	0.0066	0.0003	0.0039	<0.0002	0.004	0.0074	0.0320	0.0010	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
RPD				-	17	14	0	0	23	0	0	1	16	22	29	0	0	0	0	0	0
MW01	Normal	17 Oct 2023	EM2318553	-	0.0152	0.0063	0.0066	0.0003	0.0031	<0.0002	0.004	0.0073	0.0272	0.0008	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005
	Interlab_D	17 Oct 2023	1036822	0.0084	0.016	0.0065	0.0064	<0.005	<0.005	<0.005	0.0056	0.0079	0.038	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
RPD				-	5	3	3	0	0	0	33	8	33	0	0	0	0	0	0	0	0

*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



Table 3
RPD Exceedances

MFS

MFS Camden Park DSI

				PFAS - Perfluoroalkyl Sulfonamide							PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums					PFAS
				Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Ethyl perfluorooctane sulfonamide (EFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	N-Ethyl perfluorooctane sulfonamidoethanol (EFOSE)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EFOSAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFHxS and PFOS	Sum of US EPA PFAS (PFOS + PFOA)*	PFAS (Sum of Total)	Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	PFAS (Sum of Total)(WA DER List)	Perfluoronane sulfonate (PFNS)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.0002	0.0005	0.0005	0.0002	0.0005	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.005	0.0002	0.005	0.0002	0.005
Location Code	Sample Type	Date	Lab Report Number																	
BH03	Normal	16 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0020	-	0.0020	-	0.0020	-
	Field_D	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0069	-	0.0069	-	0.0069	-
RPD				0	0	0	0	0	0	0	0	0	0	0	110	-	110	-	110	-
BH03	Normal	16 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0020	-	0.0020	-	0.0020	-
	Interlab_D	16 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	0.0061	0.0061	<0.05	0.0061	<0.01	<0.005
RPD				0	0	0	0	0	0	0	0	0	0	0	101	-	0	-	0	-
BH06	Normal	16 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0052	-	0.0052	-	0.0052	-
	Field_D	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	-	0.0039	-	0.0039	-
RPD				0	0	0	0	0	0	0	0	0	0	0	29	-	29	-	29	-
BH06	Normal	16 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0052	-	0.0052	-	0.0052	-
	Interlab_D	16 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.01	<0.005
RPD				0	0	0	0	0	0	0	0	0	0	0	4	-	0	-	0	-
BH08	Normal	16 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	-	0.0007	-	0.0007	-
	Field_D	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	-	0.0008	-	0.0008	-
RPD				0	0	0	0	0	0	0	0	0	0	0	13	-	13	-	13	-
BH08	Normal	16 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	-	0.0007	-	0.0007	-
	Field_D	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	-	0.0008	-	0.0008	-
RPD				0	0	0	0	0	0	0	0	0	0	0	13	-	13	-	13	-
MW01	Normal	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0023	-	0.0023	-	0.0023	-
	Field_D	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	-	0.0014	-	0.0014	-
RPD				0	0	0	0	0	0	0	0	0	0	0	49	-	49	-	49	-
MW01	Normal	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0023	-	0.0023	-	0.0023	-
	Interlab_D	17 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	<0.01	<0.005
RPD				0	0	0	0	0	0	0	0	0	0	0	0	-	0	-	0	-
MW01	Normal	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0097	-	0.0711	-	0.0645	-
	Field_D	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0105	-	0.0739	-	0.0681	-
RPD				0	0	0	0	0	0	0	0	0	0	0	8	-	4	-	5	-
MW01	Normal	17 Oct 2023	EM2318553	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0097	-	0.0711	-	0.0645	-
	Interlab_D	17 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	0.0064	<0.005	0.0888	0.0064	0.0739	<0.005
RPD				0	0	0	0	0	0	0	0	0	0	0	41	-	22	-	14	-

*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 EQ
***Interlab Duplicates are matched on a per compound basis as methods vary between labor;



Table 2
Soil Exceedances

MFS

MFS Camden Park DSI

	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids											PFAS - Perfluoroalkyl	
	Perfluorobutane sulfonic acid (PFBS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)	Perfluoroheptanoic acid (PFHpA)	Perfluorooctanoic acid (PFOA)	Perfluorononanoic acid (PFNA)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0005
PFAS NEMP 2.0 2020 Ecological direct exposure					1					10									
PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites					0.14 ^{#1}														
SSHIL Metropolitan (Staffed) Sites										50									
PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)			2		2					20									

Field ID	Date	Lab Report Number																		
BH01 0.4-0.5	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0011	<0.0002	0.0085	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH01 1.7-1.8	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0010	<0.0002	0.0011	<0.0002	<0.001	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH01 2.7-2.8	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0005	<0.0002	0.0006	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH02 PAVER	16 Oct 2023	EM2318553	0.0038	0.0020	0.0138	0.0009	0.0419	<0.0002	0.002	0.0018	0.0082	0.0005	0.0013	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	0.0004	<0.0005
BH02 0.08-0.18	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0114	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH02 0.4-0.5	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0007	<0.0002	0.114	0.0005	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH02 2.5-2.6	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0004	<0.0002	0.0056	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH03 0.08-0.18	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0002	<0.0002	0.0018	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
FD01 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0002	<0.0002	0.0067	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
FS01 (inter-laboratory duplicate)	16 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.005	0.0061	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
BH03 0.75-0.85	16 Oct 2023	EM2318553	0.0003	<0.0002	0.0015	<0.0002	0.0165	<0.0002	<0.001	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH03 2.6-2.7	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH03 3.6-3.7	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH04 0.08-0.18	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0005	<0.0002	0.0153	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH04 0.65-0.75	16 Oct 2023	EM2318553	0.0019	0.0025	0.0202	0.0003	0.0503	<0.0002	<0.001	0.0004	0.0024	0.0003	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH04 2.1-2.2	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH05 PAVER	16 Oct 2023	EM2318553	0.0589	0.0506	0.186	0.0081	0.120	0.0018	0.008	0.0115	0.129	0.0126	0.0176	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	0.0006	<0.0005
BH05 0.08-0.18	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0007	0.0002	0.0675	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	0.0006	<0.0005
BH05 0.4-0.5	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0015	0.0004	0.228	0.0003	<0.001	<0.0002	0.0003	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	0.0012	<0.0005
BH05 1.0-1.15	16 Oct 2023	EM2319478	<0.0002	<0.0002	<0.0002	<0.0002	0.0011	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH05 2.0-2.1	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH06 0.08-0.18	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0052	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
FD02 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0039	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
FS02 (inter-laboratory duplicate)	16 Oct 2023	1036822	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
BH06 0.6-0.7	16 Oct 2023	EM2318553	0.0015	0.0021	0.0309	0.0057	0.228	<0.0002	<0.001	0.0003	0.0040	0.0004	0.0024	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH06 1.2-1.3	16 Oct 2023	EM2319478	<0.0002	<0.0002	0.0008	<0.0002	0.0057	<0.0002	<0.001	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH06 2.9-3.0	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0016	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH07 PAVER	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0016	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH07 0.08-0.18	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0004	<0.0002	0.0018	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH07 0.65-0.75	16 Oct 2023	EM2318553	<0.0002	0.0006	0.0134	0.0012	0.0130	<0.0002	<0.001	<0.0002	0.0005	<0.0002	0.0012	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH07 2.9-3.0	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH08 0.08-0.18	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0007	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
FD03 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
FS03 (inter-laboratory duplicate)	16 Oct 2023	1036822	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH08 0.55-0.65	16 Oct 2023	EM2318553	<0.0002	<0.0002	0.0009	<0.0002	0.0100	<0.0002	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
BH08 2.2-2.3	16 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
MW01 CONCRETE	17 Oct 2023	EM2318553	0.0152	0.0063	0.0066	0.0003	0.0031	<0.0002	0.004	0.0073	0.0272	0.0008	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
MW01 0.4-0.5	17 Oct 2023	EM2318553	<0.0002	<0.0002	0.0004	0.0003	0.0660	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	0.0002	<0.0005
MW01 0.25-0.35	17 Oct 2023	EM2318553	<0.0002	<0.0002	<0.0002	<0.0002	0.0023	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0005
FD04 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	&lt																	



Table 2
Soil Exceedances

MFS

MFS Camden Park DSI

	PFAS - Perfluoroalkyl Sulfonamide					PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums		
	N-Ethyl perfluorooctane sulfonamide (EFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	N-Ethyl perfluorooctane sulfonamidoethanol (EFOSE)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EFOsAA)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	Sum of PFHxS and PFOS	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0005	0.0002	0.0005	0.0005	0.0002	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.0002
PFAS NEMP 2.0 2020 Ecological direct exposure												
PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites												
SSHIL Metropolitan (Staffed) Sites										14		
PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)										2 ^{#2}		

Field ID	Date	Lab Report Number												
BH01 0.4-0.5	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0096	0.0096	0.0096
BH01 1.7-1.8	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0021	0.0025	0.0025
BH01 2.7-2.8	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	0.0011	0.0011
BH02 PAVER	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	0.0060	0.0006	<0.0005	0.0557	0.0832	0.0799
BH02 0.08-0.18	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0114	0.0114	0.0114
BH02 0.4-0.5	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.115	0.116	0.115
BH02 2.5-2.6	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0060	0.0060	0.0060
BH03 0.08-0.18	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0020	0.0020	0.0020
FD01 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0069	0.0069	0.0069
FS01 (inter-laboratory duplicate)	16 Oct 2023	1036822	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	0.0061	<0.05	<0.01
BH03 0.75-0.85	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0180	0.0187	0.0187
BH03 2.6-2.7	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0004	0.0004
BH03 3.6-3.7	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002
BH04 0.08-0.18	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0158	0.0158	0.0158
BH04 0.65-0.75	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0705	0.0788	0.0760
BH04 2.1-2.2	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002
BH05 PAVER	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.306	0.605	0.544
BH05 0.08-0.18	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0682	0.0690	0.0682
BH05 0.4-0.5	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.230	0.232	0.230
BH05 1.0-1.15	16 Oct 2023	EM2319478	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	0.0011	0.0011
BH05 2.0-2.1	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002
BH06 0.08-0.18	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0052	0.0052	0.0052
FD02 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	0.0039	0.0039
FS02 (inter-laboratory duplicate)	16 Oct 2023	1036822	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.01
BH06 0.6-0.7	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.259	0.275	0.268
BH06 1.2-1.3	16 Oct 2023	EM2319478	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0065	0.0070	0.0070
BH06 2.9-3.0	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0016	0.0016
BH07 PAVER	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0016	0.0016
BH07 0.08-0.18	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	0.0022	0.0022
BH07 0.65-0.75	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0264	0.0299	0.0281
BH07 2.9-3.0	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002
BH08 0.08-0.18	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.0007	0.0007
FD03 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0008	0.0008
FS03 (inter-laboratory duplicate)	16 Oct 2023	1036822	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0008	0.0008
BH08 0.55-0.65	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0109	0.0112	0.0112
BH08 2.2-2.3	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002
MW01 CONCRETE	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0097	0.0711	0.0645
MW01 0.4-0.5	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0664	0.0669	0.0664
MW01 0.25-0.35	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0023	0.0023	0.0023
FD04 (intra-laboratory duplicate)	16 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	0.0014	0.0014
FS04 (inter-laboratory duplicate)	17 Oct 2023	1036822	<0.005	<0.01	<0.005	<0.005	<0.01	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.01
MW01 2.4-2.5	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0003	0.0003	0.0003
MW02 0.08-0.18	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0004	0.0004
MW02 04.-0.5	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	0.0029	0.0029
MW02 3.3-3.4	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002
MW03 0.01-0.1	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0094	0.0094	0.0094
MW03 0.4-0.5	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0013	0.0013
MW03 2.9-3.0	17 Oct 2023	EM2318553	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0002	0.0002	0.0002

Comments
#1 This is the higher criterion for (the existing ecological indirect exposure) inter
#2 If the concentration of PFHxS > PFOS this guideline value needs to be adjust

Environmental Standards
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil a

Appendix I

Well Permits

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY

pursuant to section 112 of the Landscape South Australia Act 2019

WELL PERMIT

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

Permit No:	449011
Expiry Date:	04/10/2024

Permission is hereby granted to: GHD PTY LTD
LEVEL 3, 211 VICTORIA SQUARE
ADELAIDE SA 5000

To undertake the following water affecting activity:

Activity: Well Construction

Well Use: Investigation

CONDITIONS:

1. The activity authorised by this permit must only be undertaken on the land described below:
CT 5413/751
Allotment 6 in Deposited Plan 2237
Hundred of Adelaide
2. 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.
3. 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.
4. This work may be subject to inspection by the Department's Drilling Inspectors.
5. If this well is incidental/ancillary to mining operations authorised under the Mining Act 1971, or a regulated activity under the Petroleum and Geothermal Energy Act 2000 (Acts), the well must be decommissioned (as outlined in the Minimum Construction Requirements for Water Bores in Australia Fourth Edition) prior to the relinquishment of the licence or lease under the associated Acts, unless alternative formal arrangements can be made with the owner or occupier of the land on which the well is located subject to approval by the relevant Minister or the Minister's agent.
6. Activities shall not have an unacceptable detrimental impact on cultural, heritage or social values.
7. The activity must not adversely affect water-dependent ecosystems nearby.
8. 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.

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY

pursuant to section 112 of the Landscape South Australia Act 2019

WELL PERMIT

9. Well Construction must comply with the mandatory requirements of the Minimum Construction Requirements for Water Bores in Australia (4th Edition) and the General Specifications for Well Drilling Operations Affecting Water in South Australia (or any subsequent or related policy), as provided by the relevant authority.
10. The authorised activity must be undertaken by a licensed driller.
11. 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.
12. Water samples are required from all wells drilled in respect of this permit.
13. Strata samples are not required.
14. 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.
15. All wells must be drilled vertical unless written permission is obtained from the Minister.
16. Where a well passes or will pass through two or more aquifers, an impervious seal shall be made and maintained between the aquifers to prevent leakage between the aquifers.
17. The activity shall not significantly increase local drawdown.
18. The activity shall not adversely affect the quality, quantity and accessibility of water for supply from existing wells operated by other landholders.
19. The well subject to this permit must not be completed as an industrial water supply well unless prior approval has been obtained from the department.
20. 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.
21. Wells are to be backfilled when no longer required for ongoing monitoring and investigation purposes.
22. The well is to be completed only in the Quaternary aquifer Q1.
23. Due to known soil/groundwater contamination in the sediments and aquifers above, caution should be taken in the drilling and/or cementing of this well.

NOTES:

1. 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.
2. This permit is not transferable.
3. This 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.
4. 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 to this permit.
5. This permit is not an approval to clear native vegetation.
6. 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.

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY

pursuant to section 112 of the Landscape South Australia Act 2019

WELL PERMIT

7. This permit does not authorise the taking of water from the well for any purpose other than testing.
8. If the extracted groundwater supply is required for human consumption, it is recommended that the water be quality tested.

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 this permit is guilty of an offence, and such acts or omissions may result in the variation, suspension or revocation of the permit.



Date: 04/10/2023

Alicia Millhouse
Water Licensing Officer
Delegate of Minister for Climate, Environment and Water

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY
pursuant to section 112 of the Landscape South Australia Act 2019
WELL PERMIT

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

Permit No:	449012
Expiry Date:	04/10/2024

Permission is hereby granted to: GHD PTY LTD
LEVEL 3, 211 VICTORIA SQUARE
ADELAIDE SA 5000

To undertake the following water affecting activity:

Activity: Well Construction

Well Use: Investigation

CONDITIONS:

1. The activity authorised by this permit must only be undertaken on the land described below:
CT 5413/751
Allotment 7 in Deposited Plan 2237
Hundred of Adelaide
2. 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.
3. 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.
4. This work may be subject to inspection by the Department's Drilling Inspectors.
5. If this well is incidental/ancillary to mining operations authorised under the Mining Act 1971, or a regulated activity under the Petroleum and Geothermal Energy Act 2000 (Acts), the well must be decommissioned (as outlined in the Minimum Construction Requirements for Water Bores in Australia Fourth Edition) prior to the relinquishment of the licence or lease under the associated Acts, unless alternative formal arrangements can be made with the owner or occupier of the land on which the well is located subject to approval by the relevant Minister or the Minister's agent.
6. Activities shall not have an unacceptable detrimental impact on cultural, heritage or social values.
7. The activity must not adversely affect water-dependent ecosystems nearby.
8. 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.

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY

pursuant to section 112 of the Landscape South Australia Act 2019

WELL PERMIT

9. Well Construction must comply with the mandatory requirements of the Minimum Construction Requirements for Water Bores in Australia (4th Edition) and the General Specifications for Well Drilling Operations Affecting Water in South Australia (or any subsequent or related policy), as provided by the relevant authority.
10. The authorised activity must be undertaken by a licensed driller.
11. 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.
12. Water samples are required from all wells drilled in respect of this permit.
13. Strata samples are not required.
14. 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.
15. All wells must be drilled vertical unless written permission is obtained from the Minister.
16. Where a well passes or will pass through two or more aquifers, an impervious seal shall be made and maintained between the aquifers to prevent leakage between the aquifers.
17. The activity shall not significantly increase local drawdown.
18. The activity shall not adversely affect the quality, quantity and accessibility of water for supply from existing wells operated by other landholders.
19. The well subject to this permit must not be completed as an industrial water supply well unless prior approval has been obtained from the department.
20. 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.
21. Wells are to be backfilled when no longer required for ongoing monitoring and investigation purposes.
22. The well is to be completed only in the Quaternary aquifer Q1.
23. Due to known soil/groundwater contamination in the sediments and aquifers above, caution should be taken in the drilling and/or cementing of this well.

NOTES:

1. 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.
2. This permit is not transferable.
3. This 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.
4. 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 to this permit.
5. This permit is not an approval to clear native vegetation.
6. 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.

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY

pursuant to section 112 of the Landscape South Australia Act 2019

WELL PERMIT

7. This permit does not authorise the taking of water from the well for any purpose other than testing.
8. If the extracted groundwater supply is required for human consumption, it is recommended that the water be quality tested.

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 this permit is guilty of an offence, and such acts or omissions may result in the variation, suspension or revocation of the permit.



Date: 04/10/2023

Alicia Millhouse
Water Licensing Officer
Delegate of Minister for Climate, Environment and Water

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY
pursuant to section 112 of the Landscape South Australia Act 2019
WELL PERMIT

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

Permit No:	449013
Expiry Date:	04/10/2024

Permission is hereby granted to: GHD PTY LTD
LEVEL 3, 211 VICTORIA SQUARE
ADELAIDE SA 5000

To undertake the following water affecting activity:

Activity: Well Construction

Well Use: Investigation

CONDITIONS:

1. The activity authorised by this permit must only be undertaken on the land described below:
CT 5413/751
Allotment 8 in Deposited Plan 2237
Hundred of Adelaide
2. 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.
3. 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.
4. This work may be subject to inspection by the Department's Drilling Inspectors.
5. If this well is incidental/ancillary to mining operations authorised under the Mining Act 1971, or a regulated activity under the Petroleum and Geothermal Energy Act 2000 (Acts), the well must be decommissioned (as outlined in the Minimum Construction Requirements for Water Bores in Australia Fourth Edition) prior to the relinquishment of the licence or lease under the associated Acts, unless alternative formal arrangements can be made with the owner or occupier of the land on which the well is located subject to approval by the relevant Minister or the Minister's agent.
6. Activities shall not have an unacceptable detrimental impact on cultural, heritage or social values.
7. The activity must not adversely affect water-dependent ecosystems nearby.
8. 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.

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY

pursuant to section 112 of the Landscape South Australia Act 2019

WELL PERMIT

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13. Strata samples are not required.
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17. The activity shall not significantly increase local drawdown.
18. The activity shall not adversely affect the quality, quantity and accessibility of water for supply from existing wells operated by other landholders.
19. The well subject to this permit must not be completed as an industrial water supply well unless prior approval has been obtained from the department.
20. 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.
21. Wells are to be backfilled when no longer required for ongoing monitoring and investigation purposes.
22. The well is to be completed only in the Quaternary aquifer Q1.
23. Due to known soil/groundwater contamination in the sediments and aquifers above, caution should be taken in the drilling and/or cementing of this well.

NOTES:

1. 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.
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3. This 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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5. This permit is not an approval to clear native vegetation.
6. 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.

DEPARTMENT FOR ENVIRONMENT AND WATER

Mt Gambier Office | PO Box 1046 | Mt Gambier SA 5290 | [P] 8735 1134 [F] 8735 1135

PERMIT to undertake a WATER AFFECTING ACTIVITY
pursuant to section 112 of the Landscape South Australia Act 2019
WELL PERMIT

7. This permit does not authorise the taking of water from the well for any purpose other than testing.
8. If the extracted groundwater supply is required for human consumption, it is recommended that the water be quality tested.

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 this permit is guilty of an offence, and such acts or omissions may result in the variation, suspension or revocation of the permit.



Date: 04/10/2023

Alicia Millhouse
Water Licensing Officer
Delegate of Minister for Climate, Environment and Water

Appendix J

Survey



To: Terrence Wilson
Company: GHD
Phone: 0413 476 581

From: Lincoln Jeffery
Phone: 0414 840 569
Email: Lincoln@linkupconstructionsurveys.com.au

Date: 7/11/2023

Monitoring well coordinates – MFS Camden Park – 65 Morphett Rd, Camden Park

Well or Bore	Easting	Northing	R.L. Top of Casing	Natural Surface
No.	GDA20	GDA20	A.H.D.	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

All Survey information was based from the GDA20 Z54 grid system and Australian Height Datum (AHD), Triangulated from Network Survey Marks.

Appendix K

Gauging and Purging Records

Job Information	Sampling Information	Bore Information
Client: SA MPS	Purge Method: LOW FLOW	SWL(mbTOC): 1.093 m
Project: 12616802	Sample Method:	Screen: From: to: m
Proj. No.: CAMDEN PK MPS	WQ Meter Type: ProQuatro YSI	NAPL Check:
Sampler: AK EG NP	Flow Cell: (Y) / N	Ref.datum:
Date: 24/10/2023	Pump Depth: 3.84 m	Bore Depth: 3.584 m
Round:	WLevel Meter Type: Dip / Fox / (Int.Fce) / Gge	Logic Check:
	Field Filtered? Y / N (filter vessel, disposable filter/syringe)	Stick Up:
		Bore Diam.: mm
		Well Cap Secure?

[illegible][illegible]

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			

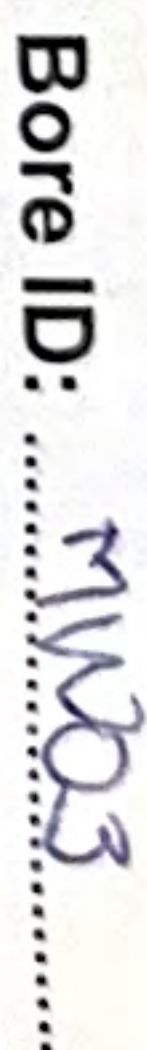


Bore ID:

[illegible]

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

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



Bore ID: 71403

Job Information		Sampling Information		Bore Information	
Client: MFS	Purge Method:	SWL(mbTOC): 1.714	m	Logic Check:	
Project: MFS CAMDEN PARK DS1	Sample Method: Low Flow (Perp. Pump)	Screen: From: to:	m	Stick Up:	m
Proj. No.: 130168.D2	WQ Meter Type:	NAPL Check:		Bore Diam.:	mm
Sampler: AK / NP 1 etc	Flow Cell: Y / N	Ref. datum:		Well Cap Secure?	
Date: 2/11/23	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Bore Depth:	m		
Round:	Field Filtered? Y / N (filter vessel, disposable filter/syringe)				

[illegible][illegible]

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

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

Appendix L

QAQC Report

Appendix I - Quality Assurance and Quality Control Report

1. GHD QA/QC Assessment

1.1 Laboratories and data set

All samples recovered during the 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	Yes	EM2318553, EM2319054
Eurofins	Secondary	Yes	1038556, 1036822, 1038561

The primary results for the DSI are outlined in the Tabulated Analytical Results section of the DSI report and included in Appendix H. The laboratory certificates of analysis are located in Appendix G. The QAQC results for the DSI are outlined in the tables at the end of this QAQC report.

The data quality assessment detailed in the following pages refers to the data provided in these laboratory reports and the results of the QAQC analysis. Please note this QAQC 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.

Tabulated analytical results are included in Appendix H. All laboratory reports including primary results, quality control reports and COC's are included in Appendix G. Borelogs and field records are included in Appendix F. Calibration certificates are included in Appendix L.

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	Eurofins/ALS Laboratory Quality Control Reports.

Item	Objective	Outcome	References
GHD Internal Procedures			
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	Eurofins/ALS Laboratory Quality Control Reports.
Analysis of laboratory spike recoveries	Recoveries within the laboratory specified recovery limits	Achieved, with some minor non-conformances – see Table 3.1	Eurofins/ALS Laboratory Quality Control Reports
Analysis of laboratory internal duplicates	Frequencies and RPDs within guideline and internal laboratory limits (RPD of 0-30%)	Achieved	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 that are chilled 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

C_s = 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 at the end of this Appendix.

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						
BH03_0.08-0.18	FD01 (D) FS01 (S)	PFOS	0.0018	0.0067	0.0061	115
		Sum of PFHxS and PFOS	0.0020	0.0069	0.0061	110
		PFAS (Sum of total)	0.0020	0.0069	<0.05	110
		PFAS (Sum of Total) (WA DER List)	0.0020	0.0069	<0.01	110
MW01_0.25-0.35	FD04 (D) FS04 (S)	PFOS	0.0023	0.0014	<0.005	49
		Sum of PFHxS and PFOS	0.0023	0.0014	<0.005	49
		PFAS (Sum of total)	0.0023	0.0014	<0.005	49
		PFAS (Sum of Total) (WA DER List)	0.0023	0.0014	<0.005	49
MW01_CONCRETE	FD05 (D) FS05 (S)	Perfluorobutanoic acid (PFBA)	0.004	0.004	0.0056	33
		Perfluorohexanoic acid (PFHxA)	0.0272	0.0320	0.038	33
		Sum of PFHxS and PFOS	0.0097	0.0105	0.0064	41
Groundwater						
MW01	FD01 (D) FS01 (S)	Perfluoropentane sulfonic acid (PFPeS)	<0.02	0.02	0.03	40
		Perfluorohexane sulfonic acid (PFHxS)	0.08	0.22	0.22	93
		Perfluorooctane sulfonic acid (PFOS)	0.06	0.30	0.52	159
		Perfluorohexanoic acid (PFHxA)	<0.02	0.03	0.03	40
		Perfluorooctanoic acid (PFOA)	<0.01	0.02	0.02	67

		Sum of PFHxS and PFOS	0.14	0.52	0.74	136
		PFAS (Sum of Total)	0.14	0.61	0.86	144
		PFAS (Sum of Total)(WA DER List)	0.14	0.59	0.81	141

2.1.1 Soil blind duplicate and split duplicate

The majority of RPDs were calculated within acceptable limits, except for some PFAS analytes in 5 duplicate samples. The elevated RPDs can be attributed to the following:

- Low analyte concentrations close to or below the LOR.
- Heterogeneity of soils, particularly soils sampled within fill material.

Given the heterogeneity of soils, 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 to some PFAS analyte in the duplicate sample. The elevated calculated RPD was likely to be associated with 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 (Boreholes)				
38	5	13.158%	5	13.2%
Groundwater				
3	1	33.3%	1	33.3%

The QC rates for the samples satisfies the data quality objectives for this investigation as they are in general accordance with Australian Standard AS4482.1-2005 and the NEMP 2.0 (2020).

2.2 Rinsate blank

Two rinsate blank samples (RB01 and RB02) were collected during the DSI 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.

3. Laboratory QA/QC

3.1 Internal duplicates

All RPDs for laboratory internal duplicates from the ALS reports were within the laboratory nominated acceptable ranges.

3.2 Matrix spikes

All matrix spikes for laboratory internal duplicates from the ALS reports were within the laboratory nominated acceptable ranges.

Table 3.1 Matrix Spike Outliers

Lab report	Analyte	Laboratory comment
ALS		
EM2318553	PFOS	MS recovery not determined, background level greater than or equal to 4x spike level.

3.3 Laboratory control spikes

All laboratory control spikes for laboratory internal duplicates from the ALS reports were within the laboratory 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.

3.6 Laboratory QA/QC summary

Given that the laboratory QA/QC result are all within the nominated acceptable ranges and limits, GHD considered 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.



Field Blanks

Lab Report Number			EM2318553	EM2318553	EM2319054	EM2319054
Matrix Type			Water	Water	Water	Water
Field ID			RB01	TB01	RB02	TB02
Date			17 Oct 2023	17 Oct 2023	24 Oct 2023	24 Oct 2023
	Unit	EQL				
PFAS - Perfluoroalkyl Sulfonic Acids						
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01
PFAS - Perfluoroalkyl Carboxylic Acids						
Perfluorobutanoic acid (PFBA)	µg/L	0.1	<0.10	<0.10	<0.1	<0.1
Perfluorodecanoic acid (PFDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorononanoic acid (PFNA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01
Perfluoropentanoic acid (PFPeA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.02	<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	<0.05
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02	<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	<0.05
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.05	<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	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
PFAS - Sums						
PFAS (Sum of Total)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01
PFAS (Sum of Total)(WA DER List)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	µg/L	0.01	<0.01	<0.01	<0.01	<0.01



Field or Interlab Duplicates

Lab Report Number Field ID Location Code Matrix Type Date Sample Type				EM2319054	EM2319054	RPD	EM2319054	1038556	RPD
				MW01	FD01		MW01	FS01	
				MW01			MW01		
				Water	Water		Water	Water	
				24 Oct 2023	24 Oct 2023		24 Oct 2023	24 Oct 2023	
	Normal	Field_D					Normal	Interlab_D	
	Unit	EQL	RPD						
PFAS - Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.01		<0.02	0.02	0	<0.02	0.02 ^{#1}	0
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.01		<0.02	<0.02	0	<0.02	0.02 ^{#1}	0
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01		0.06	0.30	133	0.06	0.52 ^{#1}	159
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.01		-	-	-	-	<0.01	-
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.01		<0.02	0.02	0	<0.02	0.03 ^{#1}	40
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.01		0.08	0.22	93	0.08	0.22 ^{#1}	93
PFAS - Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	µg/L	0.05		<0.1	<0.1	0	<0.1	<0.05	0
Perfluorodecanoic acid (PFDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
Perfluorododecanoic acid (PFDoDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
Perfluoroheptanoic acid (PFHpA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
Perfluorohexanoic acid (PFHxA)	µg/L	0.01		<0.02	0.03	40	<0.02	0.03	40
Perfluorononanoic acid (PFNA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
Perfluorooctanoic acid (PFOA)	µg/L	0.01		<0.01	0.02	67	<0.01	0.02 ^{#1}	67
Perfluoropentanoic acid (PFPeA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0
Perfluorotridecanoic acid (PFTTrDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.01		<0.02	<0.02	0	<0.02	<0.01	0
PFAS - Perfluoroalkyl Sulfonamide									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0
Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	0	<0.02	<0.05	0
PFAS - Fluorotelomer Sulfonic Acids									
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.05		<0.05	<0.05	0	<0.05	<0.05	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.01		<0.05	<0.05	0	<0.05	<0.01	0
PFAS - Sums									
PFAS (Sum of Total)	µg/L	0.01		0.14	0.61	125	0.14	0.86	144
PFAS (Sum of Total)(WA DER List)	µg/L	0.01		0.14	0.59	123	0.14	0.81	141
Sum of US EPA PFAS (PFOS + PFOA)*	µg/L	0.01		-	-	-	-	0.54	-
Sum of PFHxS and PFOS	µg/L	0.01		0.14	0.52	115	0.14	0.74	136
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	µg/L	0.01		-	-	-	-	0.76	-
PFAS									
Perfluorononane sulfonate (PFNS)	µg/L	0.01		-	-	-	-	<0.01	-

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

Oil / Water Interface Meter

Instrument **Geotech Interface Meter (30M)**
Serial No. **4021**



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	
	above 7.9v	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check Connectors	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: Jeremy Callado

Calibration date: **11-Oct-23**

Next calibration due: **08-Apr-24**

Field or Interlab Duplicates

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



Field or Interlab Duplicates

Lab Report Number Field ID Location Code Matrix Type Date Sample Type				EM2318553	RPD	EM2318553	EM2318553	RPD	EM2318553	1036822	RPD	EM2318553	EM2318553	RPD	EM2318553	1036822	RPD
				FD03 (intralab)		MW01_0.25-0.35	FD04 (intralab)		MW01_0.25-0.35	FS04		MW01_CONCRETE	FD05 (intralab)		MW01_CONCRETE	FS05	
				BH08		MW01	MW01		MW01	MW01		MW01	MW01		MW01	MW01	
				Soil		Soil	Soil		Soil	Soil		Soil	Soil		Soil	Soil	
				17 Oct 2023		17 Oct 2023	17 Oct 2023		17 Oct 2023	17 Oct 2023		17 Oct 2023	17 Oct 2023		17 Oct 2023	17 Oct 2023	
Field_D				Normal	Field_D	Normal	Interlab_D	Normal	Field_D	Normal	Field_D	Normal	Interlab_D				
	Unit	EQL	RPD														
Misc.	%	1		-	-	-	-	-	4.9	-	-	-	-	-	5.2	-	
Inorganics	%	0.1		7.0	6	8.9	8.8	1	8.9	-	-	4.8	5.9	21	4.8	-	
PFAS - Perfluoroalkyl Sulfonic Acids																	
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0152	0.0128	17	0.0152	0.016 ^{#1}	
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	
Perfluoroheptane sulfonic acid (PFHpS)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0003	0.0003	0	0.0003	<0.005	
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002		0.0008	13	0.0023	0.0014	49	0.0023	<0.005	0	0.0031	0.0039	23	0.0031	<0.005	
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.005		-	-	-	-	-	-	<0.005	-	-	-	-	-	0.0084	
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0063	0.0055	14	0.0063	0.0065 ^{#1}	
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0066	0.0066	0	0.0066	0.0064 ^{#1}	
PFAS - Perfluoroalkyl Carboxylic Acids																	
Perfluorobutanoic acid (PFBA)	mg/kg	0.001		<0.001	0	<0.001	<0.001	0	<0.001	<0.005	0	0.004	0.004	0	0.004	0.0056	
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	
Perfluoroheptanoic acid (PFHpA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0008	0.0010	22	0.0008	<0.005	
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0272	0.0320	16	0.0272	0.038	
Perfluorononanoic acid (PFNA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0003	0.0004	29	0.0003	<0.005	
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0073	0.0074	1	0.0073	0.0079	
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
Perfluorotridecanoic acid (PFTrDA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	
PFAS - Perfluoroalkyl Sulfonamide																	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002		<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	
PFAS - Fluorotelomer Sulfonic Acids																	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.01	0	<0.0005	<0.0005	0	<0.0005	<0.01	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005		<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	
PFAS - Sums																	
PFAS (Sum of Total)	mg/kg	0.0002		0.0008	13	0.0023	0.0014	49	0.0023	<0.05	0	0.0711	0.0739	4	0.0711	0.0888	
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002		0.0008	13	0.0023	0.0014	49	0.0023	<0.01	0	0.0645	0.0681	5	0.0645	0.0739	
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005		-	-	-	-	-	<0.005	-	-	-	-	-	-	<0.005	
Sum of PFHxS and PFOS	mg/kg	0.0002		0.0008	13	0.0023	0.0014	49	0.0023	<0.005	0	0.0097	0.0105	8	0.0097	0.0064	
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005		-	-	-	-	-	<0.005	-	-	-	-	-	-	0.0064	
PFAS																	
Perfluorononane sulfonate (PFNS)	mg/kg	0.005		-	-	-	-	-	<0.005	-	-	-	-	-	-	<0.005	

Comments

#1 Quantification of linear and branched isomers has been conducted as a single total response using the r

*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 l

***Interlab Duplicates are matched on a per compound basis as methods vary between lab

