



MFS Port Augusta Station

Supplementary Detailed Site Investigation

South Australian Metropolitan Fire Service

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→ The Power of Commitment



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Executive Summary

Background

GHD Pty Ltd (GHD) was commissioned by the South Australian (SA) Metropolitan Fire Service (MFS) to undertake a supplementary Detailed Site Investigation (DSI) for MFS Port Augusta Station, located at 1 Trent Road, Port Augusta, South Australia, 5700 (the site). Historically, MFS has used AFFF containing per- and poly-fluoroalkyl substances (PFAS) at the site during training activities. In recent years, the SA Environment Protection Authority (EPA) has requested MFS to investigate the potential presence of residual PFAS at their sites.

GHD completed a PSI for the MFS Port Augusta Station in 2023 (GHD 2023a), and subsequently an SAQP (GHD 2023b) and DSI (GHD 2024). The DSI found PFAS impacts in on-site soils and recommended additional investigations be undertaken to delineate impacts on-site and in the immediate surrounds. These recommendations were endorsed by the SA Environment Protection Authority (EPA) in a letter dated 19 June 2024 (EPA GENI 63248) (Appendix A), with further advice to include:

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

Objectives

The primary objectives of the supplementary DSI were to:

- Address identified data gaps in understanding the nature and extent of identified PFAS contamination at the site.
- Refine the conceptual site model (CSM) receptor linkages and evaluate the exposure risks associated with such pathways.

Scope of Work

To achieve the above objectives, the scope of work for the additional investigations was as follows:

- Undertake an on- and off-site drilling program to assess the following:
 - Potential for PFAS contamination in groundwater hydraulically downgradient of the site.
 - Potential ambient/background PFAS impacts from other sources upgradient of the site.
- Undertake an intrusive soil sampling program within the eastern portion of the site (Trent Road) as well as within the SA Water area in the southern portion of the site to assess for potential PFAS contamination.
- Assess the potential for impacted surface water runoff to serve as a pathway for the migration of PFAS to nearby surface water receptors.
- Undertake groundwater sampling and testing for PFAS compounds from the three existing and three newly installed wells.
- Preparation of a supplementary DSI report to further refine the CSM.

Conclusion

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

- On-site soils showed minimal contamination with no exceedances of adopted human health criteria. However, historical and current soil data indicate that PFAS concentrations exceed ecological indirect exposure assessment criteria at depths extending from surface to 1.6m bgl, presenting potential ecological risks associated with PFAS bioavailability and bioaccumulation in vegetated areas on-site.
- On-site groundwater wells exhibited elevated PFAS concentrations, exceeding ecological protection criteria. Potential exposure risks to downgradient ecosystems via the groundwater pathway can therefore not be precluded at this stage.
- Elevated PFAS concentrations were recorded at MW04 (located directly south of the site), exceeding the recreational water, drinking water and marine water ecological protection criteria.

- PFAS concentrations at the up-hydraulic gradient MW05 represents background / ambient conditions, indicating the widespread and pervasive nature of PFAS contamination in the environment. The presence of other upstream sources is likely contributing to the observed background / ambient concentrations, further demonstrating the cumulative and persistent nature of PFAS impacts.
- MW06, located further downgradient of MW04, reported lower PFAS concentrations, however still in excess of the stringent marine water ecological criteria for 99% species protection. However, it is unclear if the site is contributing to this. Further, given these observations, practical delineation of downgradient groundwater impacts has potentially been achieved between MW04 and MW06.
- Surface water results showed localised exceedances of marine ecological thresholds, particularly at SW03, with lower levels observed at SW01 and SW02. These results are potentially indicative of other PFAS sources in the area, considering SW01 and SW02 samples were collected on or directly adjacent to the site.
- While direct human health risks from recreational water use are minimal, ecological risks are plausible due to potential PFAS transport into marine ecosystems.
- The potential risk of bioaccumulation and biomagnification in aquatic ecosystems cannot be discounted at this stage, as ecological exposure risks on marine food webs via the surface water pathway is plausible given the close proximity of the site to the Spencer Gulf, however not confirmed.
- The analytical results indicate localised PFAS contamination in soil on-site and residual groundwater impacts, with potential ecological impacts emerging as the primary concern.

Recommendations

To mitigate the potential ecological and human health exposure risks the following recommendations are proposed:

- Expand surface water monitoring to better understand the surface water migration pathways, particularly the potential discharge points to marine environments like the Spencer Gulf.
- Establish additional surface water monitoring locations along potential runoff and discharge pathways to track PFAS migration from the site into nearby aquatic environments, including streams, drainage systems, and marine ecosystems such as the Spencer Gulf.
- Following additional assessment of the surface water migration pathways and possible extent, a targeted ecological risk assessment to evaluate bioaccumulation and biomagnification potential in on-site terrestrial and off-site aquatic ecosystems may be required.
- Continue routine monitoring of groundwater, and surface water for PFAS concentrations at key locations, including on-site wells (MW01, MW02, MW03) and off-site wells (MW04, MW05, MW06). At this stage practical delineation of the groundwater impacts has potentially been achieved between wells MW04 and MW06. While it is likely the groundwater impacts extend beyond MW04, they have not reached MW06. Further, the concentrations in MW06 are similar to those present in MW05 which is considered to represent the background conditions surrounding the site.
- If required, establish community engagement by informing local stakeholders and communities about the results of the investigation and ongoing efforts to manage PFAS contamination.

Limitations

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.4 and the assumptions and qualifications contained throughout the Report.

Table of Abbreviations

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

Abbreviation	Full Form
SOP	Standard Operating Procedure
SPR	Source-Pathway-Receptor
SWL	Standing Water Level
TDS	Total Dissolved Solids
TOC	Top of Casing
VSCAP	Voluntary Site Contamination Assessment Proposal
WQEPP	South Australian <i>Environmental Protection (Water Quality) Policy</i> 2015
µg/L	Micrograms/litre
µS/cm	Microsiemens/centimetre

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1. Introduction

In 2024, GHD Pty Ltd (GHD) was commissioned by the South Australian (SA) Metropolitan Fire Service (MFS) to undertake a Detailed Site Investigation (DSI) for the MFS Port Augusta Station (the site), located at 1 Trent Road, Port Augusta, South Australia, 5700 (the site), investigating potential per- and poly-fluoroalkyl substance (PFAS) contamination at the site. The findings were as follows:

- PFAS soil impacts were noted on-site, which can be attributed to the historical use of AFFF containing PFAS at the station. The impacts were not uniformly distributed across historic on-site source areas and were primarily confined within surface and near-surface strata (approximately 0.0 - 0.5 m below ground level [bgl]), in which concentrations above the adopted ecological assessment criterion were reported.
- PFAS concentrations in on-site soils were below the adopted MFS Site-specific Health Investigation Levels (SSHILs).
- The presence and extent of PFAS within the southeastern corner of the site, currently under the jurisdiction of South Australia Water Assets, was still undefined, owing to the area being inaccessible during that round of fieldworks.
- Based on the findings, the following recommendations were made in the DSI:
 - Collection of soil samples on adjacent SA Water land to assess the degree and extent of PFAS soil impacts within the southeastern corner of the site, formerly under the control of MFS.
 - Collection of surface/near-surface soil samples at adjacent, off-site locations to assess the degree and extent of PFAS soil impacts potentially emanating from various dispersal mechanisms.
 - Consideration should be given to sealing the surface of the rear yard (e.g., with pavers or asphalt) to restrict floral and faunal access to contaminated soils above the ecological assessment criteria and thereby address the exposure pathway risk. This measure would also address the potential surface water runoff and dust exposure pathways.
 - Installation of a series of off-site groundwater monitoring wells (one up-hydraulic gradient and three down-hydraulic gradient) to assess the lateral extent of groundwater impacts and potential marine and terrestrial ecosystem exposure risks via the groundwater pathway.
 - Conduct a groundwater-use survey near the site to evaluate the potential exposure risk attributable to the possible use of groundwater for currently unidentified domestic/recreational purposes. It is noted that the groundwater-use survey has been deferred until a better understanding of the degree and extent of PFAS impacts from the site has been established.

These recommendations were endorsed by the SA Environment Protection Authority (EPA) in a letter dated 19 June 2024 (EPA GENI 63248) (Appendix A), with further advice to include:

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

This supplementary DSI addresses the above recommendations and is limited to the nature and extent of potential impacts from the historical use of aqueous film-forming foams (AFFF) containing PFAS.

1.1 Background

Historically, MFS used AFFF containing PFAS at the site during training activities. However, it is understood that MFS commenced phasing out the use of AFFF 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 concentrate in 2016. Currently, all MFS appliances utilise firefighting foams that do not contain PFOS or PFOA and are fluorine-free. During 2017/2018, MFS removed all fire extinguishers containing PFAS from their inventory.

1.2 Objectives

The primary objectives of the supplementary DSI were to:

- Address identified data gaps in understanding the nature and extent of identified PFAS contamination at the site.
- Refine the conceptual site model (CSM) receptor linkages and evaluate the exposure risks associated with such pathways.

1.3 Scope of works

This DSI has been prepared with reference to industry standards and guidelines including:

- 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.
- National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPM).
- Gov SA 2015, Environment Protection (Water Quality) Policy 2015 (WQEPP), Version 1.7.2020, Government of South Australia, updated 2020.
- 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).
- 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.
- HEPA 2020, PFAS National Environmental Management Plan (Version 2.0), Heads of Environment Protection Authorities Australia and New Zealand, January 2020, (PFAS NEMP).
- NSW EPA 2022, Sampling Design Guidelines for Contaminated Land, Environment Protection Authority, New South Wales, August 2022.

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

- Advancement of five soil boreholes with associated soil logging, target-depth sampling and PFAS analysis across the site to approximately 2 m below ground level (m bgl) to provide coverage across the site where historical PFAS impacts may have occurred.
- Collection of four surface (0.0 - 0.1 m bgl) and near-surface soil samples (0.2 - 0.3 m bgl) in the garden bed adjacent to station building and upgradient of the site.
- Installation and development of three permanent off-site groundwater monitoring wells, with subsequent groundwater sample collection and analysis for PFAS analytes (including samples collected from three on-site wells installed as part of the previous DSI).
- Surveying of the three off-site groundwater monitoring wells relative to Australian Height Datum (AHD).
- Collection of three surface water samples on-site and downgradient of the site.
- Preparation of a supplementary DSI report, including the refinement of the Conceptual Site Model (CSM), detailing the potential sources of contamination, receptors, and exposure pathways.

1.4 Limitations

This report: has been prepared by GHD for South Australian Metropolitan Fire Service and may only be used and relied on by South Australian Metropolitan Fire Service for the purpose agreed between GHD and South Australian Metropolitan Fire Service as set out in section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than South Australian Metropolitan Fire Service arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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

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

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

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

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

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Accessibility of documents

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

1.5 Assumptions

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

- Surrounding land-uses include residential properties to the north and east, with commercial land to the south and west. Open space/parkland is present to the east, within the residential area.
- No fruit, vegetables or herbs are grown on-site for human consumption.
- The term PFAS refers to a large number of per- and poly-fluorinated compounds. The primary analytical suite adopted for this assessment incorporated 28 compounds, including PFOS, PFHxS and PFOA, which are the primary focus of this report.
- The screening levels used in this report were consistent with the guidance provided by Australian regulators at the time of reporting.

2. Site Information and Environmental Setting

For site information, including environmental setting, please refer to the DSI (GHD 2024).

3. Previous Investigations

Previous PFAS investigations at the MFS Port Augusta Fire Station have been carried out by GHD in 2019, 2022 and 2023. Details of these investigations can be found in the following reports:

- GHD (2019) *MFS State-wide Appliance and Station Sampling*, Report for South Australian Metropolitan Fire Service, May 2019.
- GHD (2022) *MFS 17 Fire Stations PFAS Risk Profiling*, Report for South Australian Metropolitan Fire Service, October 2022.
- GHD (2023a) *MFS Port Augusta Station, Preliminary Site Investigation*, Report for South Australian Metropolitan Fire Service, June 2023.
- GHD (2023b) *MFS Port Augusta Station, Sampling and Analysis Quality Plan*, Report for South Australian Metropolitan Fire Service, August 2023.

For summaries of the above, please refer to the DSI report (GHD 2024).

GHD also completed a DSI report for the MFS Port Augusta Fire Station in 2024 (GHD 2024), the findings of which are summarised in Section 1.

4. Assessment Criteria

Since PFAS was the contaminant of concern addressed in this environmental investigation, the pertinent assessment criteria were adopted from the following documents:

- HEPA 2020, PFAS National Environmental Management Plan (Version 2.0), Heads of Environment Protection Authorities Australia and New Zealand, January 2020, (PFAS NEMP).
- NHMRC 2011, Australian Drinking Water Guidelines 6 (ADWG), Version 3.7, National Water Quality Management Strategy, National Health and Medical Research Council and Natural Resources Management Ministerial Council, Commonwealth of Australia, updated September 2022.
- GHD 2023c, Derivation of Site-specific Health Investigation Levels for Urban and Regional Fire Stations – South Australian Metropolitan Fire Service (MFS), June 2023.

4.1 Soil

In accordance with the PFAS NEMP 2020 and ASC NEPM (as amended 2013), the PFAS assessment criteria listed in Table 1 were adopted for the assessment of analytical results obtained from soil samples collected on-site. For the rationale and reasoning for adopting the selected criteria, refer to the DSI (GHD 2024).

Table 4.1 Adopted PFAS Assessment Criteria – Soil

Exposure scenario	PFHxS ¹ mg/kg	PFOS ² mg/kg	Sum of PFOS and PFHxS mg/kg	PFOA ³ mg/kg	Reference Document
Human Health Investigation Levels (HIL)					
SSHIL – Regional (retained) MFS Station	-	-	40	50	Derivation of SSHILs for urban and regional fire stations (GHD 2023c)
HIL B – residential with limited soil contact ⁴	2	2	2	20	PFAS NEMP 2.0 (HEPA 2020)
Ecological Screening Levels					
Ecological indirect exposure – developed sites	-	0.14 ⁵	-	-	PFAS NEMP 2.0 (HEPA 2020)
Ecological direct exposure	-	1	-	10	

Notes:

¹ PFHxS – perfluorohexane sulfonate.

² PFOS – perfluorooctane sulfonate.

³ PFOA – perfluorooctanoic acid.

⁴ Trigger level for further union engagement.

⁵ 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 is appropriate.

4.2 Groundwater

Screening criteria for groundwater are chosen based on environmental values (EVs) outlined in the SA Environment Protection (Water Quality) Policy 2015 (and amendments) (SA EPA 2015) (EPP) and the regulatory requirements for the protection of all water bodies (surface and groundwater) under the Environment Protection Act 1993. For the methodology for determination of EVs for the site and selection of screening criteria, refer to the DSI (GHD 2024).

The adopted groundwater screening/investigation levels are summarised in Table 2.

Table 4.2 *Adopted PFAS Interim Screening Criteria for Groundwater*

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

Notes:

¹ PFOS – perfluorooctane sulfonate.

² PFHxS – perfluorohexane sulfonate.

³ PFOA – perfluorooctanoic acid.

⁴ 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.

⁵ Australian Drinking Water Guidelines 6, Version 3.7, updated January 2022.

5. Soil investigation

5.1 Soil sample locations and rationale

The soil investigation works described in this section were conducted on the 23 and 24 September 2024 under the supervision of an experienced GHD environmental professionals. A total of five soil boreholes (BH08 - BH12) and two shallow soil bores (SS08 - SS09) were advanced and sampled. Soil samples were also collected during the drilling of three monitoring wells (MW04 - MW06). A description of the soil sample locations is provided in Table 3. Sample locations are shown on at the end of the report.

Table 5.1 Soil bore locations

Sample ID	Location Description
BH08	Adjacent to the southern wall of the main station building in a garden bed.
BH09	In a grassed area between the main station building and Trent Road.
BH10	Eastern portion of the SA Water asset in the southern corner of the site.
BH11	Northern portion of the SA Water asset in the southern corner of the site.
BH12	Western portion of the SA Water asset in the southern corner of the site.
SS08	Adjacent to the southern wall of the main station building in a garden bed, east of BH08.
SS09	In a residential garden bed north-east of the site.
MW04	Monitoring well down-hydraulic gradient of the site in a central reservation on Stirling Road.
MW05	Monitoring well up-hydraulic gradient of the site on the corner of Carlton Parade and Parkside Row.
MW06	Monitoring well down-hydraulic gradient of the site on Railway Parade.

5.2 Soil sampling methodology

The soil investigation methodology was as follows:

- Prior to intrusive works, a review of Before You Dig plans was conducted, and all investigation locations were cleared for underground services by an accredited service locator (Patriot Group Pty Ltd) to ensure safe drilling conditions.
- Soil bores were advanced by means of hand auger or utilising an Eziprobe drill rig (push-tube drilling technique), operated by WB Drilling Pty Ltd. 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 to assess the underlying geology and contaminant indicators in accordance with AS 1726:2017.
- Representative soil samples were collected at regular depth intervals and/or at each new soil horizon.
- A fresh pair of nitrile gloves were worn by the sampler when collecting soil samples. Soil samples were placed in laboratory-supplied sampling jars suitable for PFAS analysis.
- Soil samples were stored under chilled conditions in an esky and transported to analytical laboratories under chain of custody documentation.

5.3 Soil analytical program

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

One sample from each shallow soil bore location and three samples from each borehole location were submitted for laboratory analysis of PFAS (Extended Suite). This resulted in the analysis of 24 primary soil samples and

three duplicate pairs as part of QA/QC protocol. A further discussion of the quality assurance (QA) and quality control (QC) procedures undertaken is presented in Appendix I.

5.4 Soil sampling results

5.4.1 Subsurface conditions

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

- Fill material was predominantly encountered at the surface (0.0 - 0.2 m bgl). This material generally comprised silty sand.
- Natural material was noted from 0.8 m bgl to the borehole termination depth. This material also generally comprised silty sand.
- No evidence of staining or the presence of any distinguishable olfactory odours were noted during sampling.
- Additional details of the lithological layers observed during the soil sampling program can be found in Appendix D.

5.4.2 Analytical results

Results of the soil analytical testing are summarised in the Table 1 (Appendix F) at the end of the report. The laboratory certificates of analysis are contained in Appendix E.

Results above the adopted PFAS assessment criteria are presented in Table 5.2.

Table 5.2 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)
PFAS NEMP 2.0 2020 Ecological indirect exposure			0.14		
BH09	1.5	0.0024	0.203	0.0011	0.205

Notes:

Dark aqua denotes an exceedance of the ecological indirect exposure assessment criteria for developed sites.

The concentrations of all remaining PFAS chemicals in samples assessed were reported either below the laboratory reporting limits or below the adopted ecological and health assessment criteria.

6. Groundwater investigation

6.1 Groundwater scope

Three groundwater wells (MW04 – MW06) were installed at the site on 23 and 24 September 2024 under the supervision of experienced GHD environmental professionals. Refer to Section 5.1 for locations and rationale for the new groundwater wells.

The scope of the groundwater investigation undertaken is summarised below:

- Installation and development of three new off-site groundwater monitoring wells (MW04 - MW06).
- Surveying of the newly installed groundwater monitoring wells relative to Australian Height Datum (AHD).
- Collection and analysis of groundwater samples from six monitoring wells (three existing and three newly installed) for PFAS (extended suite) compounds in accordance with QA/QC protocol.
- Comparison of reported analytical results against adopted groundwater assessment criteria.

6.2 Well Installation methodology

All groundwater monitoring wells were drilled and installed by WB Drilling Pty Ltd under the supervision of experienced GHD environmental professionals. The drilling method used included push-tube, for the collection of soil samples, and solid flight auger to widen the borehole. Copies of well permits are provided in Appendix B.

The construction methodology for each well is outlined below:

- A 3.0 m slotted PVC screen (class 18) was 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 approximately 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, flush with the surrounding ground surface.
- Following installation, the groundwater wells were developed to remove excess silt/sediments to connect the well to the aquifer. The wells were developed using a stainless-steel bailer which was decontaminated between well locations using a phosphate-free detergent and rinsed with tap water and de-ionised water.
- Groundwater wells were surveyed by a licensed surveyor (Linkup Construction Surveys Pty Ltd). The survey data are included in Appendix C.

Table 5 below presents a summary of the construction and survey details of the wells. Groundwater well construction logs are presented in Appendix D.

Table 6.1 Well Construction Details

Well ID	Well Construction Permit No.	Installation Date	Installation Depth (m bgl)	Screen Interval (m bgl)	Co-ordinates (GDA20 Z53)		Ground Level (m AHD)	TOC (m AHD)
					Easting	Northing		
MW04	P-503510	23/09/2024	4.5	1.5 - 4.5	760288.15	6400989.942	3.863	3.796
MW05	P-503509	23/09/2024	7.0	4.0 - 7.0	760262.667	6401179.437	7.426	7.297
MW06	P-503508	24/09/2024	4.0	1.0 - 4.0	760283.779	6400850.597	3.013	2.943

6.3 Groundwater sampling methodology

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

Newly installed 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 9 October 2024.

Wells were gauged prior to sampling. The standing water levels were measured from the top of the well casing using an interface probe. Wells were purged and sampled using a low flow sampling technique (bladder pump). During purging, field water 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 into laboratory supplied bottles suitable for PFAS analysis. The samples were subsequently stored in an esky and delivered under chilled conditions to the analytical laboratory with accompanying chain of custody documentation.

The groundwater gauging and sampling records are provided in Appendix G. Calibration certificates for equipment used are provided in Appendix H.

6.4 Groundwater analytical program

All groundwater samples were analysed by Eurofins (primary) and ALS (secondary), a NATA-accredited laboratory, for PFAS (Extended Suite) analytes. In addition, QA/QC samples were analysed in accordance with quality control protocol.

6.5 Groundwater sampling results

6.5.1 Groundwater levels and inferred groundwater flow

Prior to sampling, groundwater levels were gauged from a marked point on the well casing using an electronic interface water level meter during the groundwater monitoring event. Groundwater levels are presented in Table 6.

Table 6.2 Relative groundwater levels (to AHD)

Well ID	Surveyed Top of Casing (TOC) (m AHD)	Surveyed Ground Level (m AHD)	Depth to Groundwater (m bTOC)	Relative Groundwater Level (m AHD)
MW01	4.314	4.388	2.926	1.314
MW02	3.524	3.587	2.157	1.304
MW03	3.556	3.636	2.179	1.297
MW04	3.796	3.863	2.360	1.369
MW05	7.297	7.426	5.819	1.349
MW06	2.943	3.013	1.646	1.227

The groundwater gauging results and survey data were used to prepare a groundwater contour map, presented at the end of the report. Groundwater was inferred to flow in a south-westerly direction, which is consistent with the expected regional groundwater flow and local topography.

6.5.2 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, development, or sampling phases of the investigation.

Groundwater quality parameters were monitored during purging and at the time of sampling. The final values of these parameters prior to sampling are summarised in Table 7.

Table 6.3 *Field-measured groundwater quality parameters*

Well ID	Date	Temp (°C)	pH	Dissolved oxygen (mg/L)	Oxidation-reduction potential (mV)	Electrical conductivity (µS/cm)
MW01	09/10/2024	21.7	7.10	4.6	33.9	6, 965
MW02	09/10/2024	21.5	6.90	2.0	64.2	19, 745
MW03	09/10/2024	21.6	7.01	4.6	64.6	13, 613
MW04	09/10/2024	23.1	6.76	3.2	95.4	27, 849
MW05	09/10/2024	25.4	6.95	17.1 *	64.7	18, 383
MW06	09/10/2024	23.1	6.31	39.4 *	17.2	46, 899

Notes:

* Water Quality Probe Malfunction for Dissolved Oxygen

The above field parameters are indicative of the following:

- The shallow groundwater encountered at the site is neutral with pH ranging between 6.31 and 7.10.
- The groundwater is brackish to saline with electrical conductivity values ranging between 6,965 and 46,899 µS/cm.

6.5.3 Analytical results

Results of the groundwater analytical testing are summarised in the Table 2 at the end of the report.

The laboratory certificates of analysis are contained in Appendix E.

Results above the adopted PFAS assessment criteria are presented in Table 8.

Table 6.4 *Summary of groundwater exceedances against adopted criteria*

Location	Approximate Distance from Nearest Site Boundary (m)	Date	PFHxS (µg/L)	PFOS (µg/L)	PFOA (µg/L)	Sum of PFHxS and PFOS (µg/L)
PFAS NEMP 2.0 2020 Freshwater - 95% - slightly to moderately disturbed systems				0.13	220	
PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems				0.00023	19	
PFAS NEMP 2.0 2020 Recreational Water			2	2	10	2
MW01	0 (on-site)	09/10/2024	0.414	1.73	0.0221	2.14
MW02	0 (on-site)	09/10/2024	6.38	0.545	0.200	6.92
MW03	0 (on-site)	09/10/2024	3.60	0.380	0.107	3.98
MW04	15 (south-west boundary)	09/10/2024	73.7	36.4	4.66	110
MW05	130 (northern corner)	09/10/2024	0.0186	0.256	0.001	0.0442
MW06	140 (south-west boundary)	09/10/2024	0.0619	0.0372	0.0088	0.0991

Notes:

Green denotes an exceedance of the human health assessment criteria for recreational water use.

Dark aqua denotes an exceedance of the marine water assessment criteria for 95% species protection.

Light aqua denotes an exceedance of the marine water assessment criteria for 99% species protection.

In addition to the above PFAS analyses, major cation and anion analytes were also analysed at one monitoring well (Table 9) and PFAS TOPA analysis at two monitoring wells (Table 10).

Table 6.5 *Summary of major cations and anions*

Location	Date	Chloride (mg/L)	Sulphate (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	TDS (mg/L)
MW04	09/10/2024	8830	1400	450	313	6170	17823.36

Table 6.6 *Summary of TOPA PFAS concentrations*

Location	Date	PFHxS (TOPA) (µg/L)	PFOS (TOPA) (µg/L)	PFOA (TOPA) (µg/L)	Sum of PFHxS and PFOS (TOPA) (µg/L)
MW01	09/10/2024	0.416	1.45	0.028	1.87
MW04	09/10/2024	83.4	37	4.83	120

Notes:

Green denotes an exceedance of the human health assessment criteria for recreational water use.

Dark aqua denotes an exceedance of the marine water assessment criteria for 99% species protection.

7. Surface water investigation

7.1 Surface water scope and methodology

Four surface water samples were collected on the 9 October 2024 by an experienced GHD environmental professional.

The scope of the surface water investigation undertaken is summarised below:

- MFS staff released water from a fire hydrant on-site to create surface water runoff. One water sample (SW_HYDRANT) was taken directly from the outlet of the hose connected to the hydrant.
- Samples were taken at intervals at an increasing distance from the site:
 - One water sample along Trent Road from a drain directly discharging from the site.
 - One water sample from the corner of Stirling Road and Trent Road.
 - One water sample along Trent Road, downgradient of the site.
- Samples were collected directly into laboratory supplied containers suitable for PFAS analysis.
- Samples were stored under chilled conditions in an esky and transported to analytical laboratories under chain of custody documentation.
- One sample from each location was submitted for laboratory analysis.
- Comparison of reported analytical results against the same assessment criteria adopted for groundwater assessment.

7.2 Surface water analytical results

A summary of exceedances to the adopted water criteria is tabulated below. For detailed analytical surface water results, please refer to the Table 3 in the appendices at the end of the report. Laboratory reports are contained in Appendix E.

Table 7.1 Summary of surface water exceedances against adopted criteria

Location	Approximate Distance from Nearest Site Boundary (m)	Date	PFHxS (µg/L)	PFOS (µg/L)	PFOA (µg/L)	Sum of PFHxS and PFOS (µg/L)
PFAS NEMP 2.0 2020 Freshwater - 99% - high conservation value systems				0.00023	19	
SW_HYDRANT	0 (on-site)	09/10/2024	<0.0005	0.0008	<0.0005	0.0008
SW01	2 (south-east boundary)	09/10/2024	0.0026	0.0081	0.0006	0.0107
SW02	15 (southern corner)	09/10/2024	0.0046	0.0120	0.0006	0.0166
SW03	90 (southern corner)	09/10/2024	0.0268	0.0492	0.0031	0.0760

Notes:

Light aqua denotes an exceedance of the marine water assessment criteria for 99% species protection.

In addition to the above PFAS analyses, major cation and anion analytes were also analysed at three surface water locations (Table 12).

Table 7.2 Summary of major cations and anions - surface water

Location	Date	Chloride (mg/L)	Sulphate (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)
SW01	09/10/2024	113	48	12	5	88
SW02	09/10/2024	113	46	12	4	86
SW03	09/10/2024	117	52	12	5	87

8. Quality Assurance and Quality Control

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

Refer to Appendix I for the QA/QC assessment.

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.

For information regarding potential contamination sources, contaminants of concern, site exposure pathways, and receptors, refer to the DSI report (GHD 2024).

9.1 Potential source-pathway-receptor linkages

Based on the potential SPR linkages identified in this investigation and information obtained from the PSI and DSI (GHD 2023a, GHD 2024), a CSM has been developed and refined for the site, presented in Table 13.

Graphical representations of the CSM can be found in and at the end of the report.

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 of PFAS impacts 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.

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

Table 9.1 CSM for PFAS Exposure – SPR Linkage Assessment

Potential Source	Potential Receptor	Exposure Pathway	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 No exceedances of human health assessment criteria were identified within the MFS site. PFAS levels in on-site soils, including BH09, are below adopted health investigation levels.
		Incidental ingestion of contaminated soil	Unlikely On-site soils, including those near BH09, do not exhibit PFAS concentrations that would pose a human health risk via ingestion. The depth of BH09 contamination reduces accessibility during routine site activities, further minimising risks.
		Inhalation of contaminated soil or dust from disturbed soils	Unlikely PFAS contamination has not been identified in surface soils. Subsurface contamination at BH09 is unlikely to generate airborne dust or pose inhalation risks.
	Ecosystem at, and immediately surrounding, the site	Direct contact with contaminated soil	Possible The exceedance of ecological indirect exposure assessment criteria (0.205 mg/kg Sum PFHxS and PFOS) at BH09 and other locations identified in the previous DSI indicate a potential source-pathway-receptor linkage for on-site ecological receptors. However, given the depth of the reported exceedance at BH09 (1.5 m bgl), ecological exposure risks are considered unlikely at this particular location.
		Ingestion of contaminated soil	Possible - Unlikely The elevated PFAS concentrations in soils on-site could pose ingestion risks for on-site terrestrial fauna, particularly in areas where soil is highly exposed. However, given the depth >0.5m this would be unlikely.
		Bioaccumulation through indirect contact	Possible PFAS compounds are known to bioaccumulate in ecological systems. The exceedance at BH09 as well as other locations on-site (BH01 and BH07) from previous investigations indicate the potential for bioaccumulation in nearby vegetation and wildlife.
	People growing edible vegetation in impacted soil	Consumption of PFAS impacted edible vegetation	Unlikely MFS removed all edible vegetation from the site. Although rosemary bushes remain for ornamental purposes, there is no evidence to suggest PFAS transfer to these plants, reducing risk to human health.
	Groundwater beneath the site	Rainwater/surface runoff leaching impacted soil followed by migration through porous media into groundwater	Confirmed Groundwater samples collected on-site wells (MW01, MW02, and MW03) indicate PFAS concentrations above adopted human health and ecological criteria. The highest on-site concentration (6.92 µg/L Sum PFHxS and PFOS) was observed at MW02. This confirms a source-pathway-receptor linkage for on-site groundwater contamination.
On-site PFAS impacted concrete surfaces	Soil and groundwater beneath the site	Rainwater/surface runoff leaching impacted concrete followed by	Possible Although analyses of paver/concrete samples at other MFS sites yielded results below the adopted PFAS assessment criteria protective of human health and the environment,

Potential Source	Potential Receptor	Exposure Pathway	Risk from exposure through SPR Linkages
		migration through porous media into groundwater	concrete hardstand within historical source zones, is yet to be assessed. Concrete hardstand in historical source areas may present a PFAS-flux risk.
Off-site PFAS impacted soils	Off-site users of the area inclusive of maintenance and subsurface construction workers	Direct dermal contact with contaminated soil	Unlikely No exceedances were identified in off-site locations.
		Incidental ingestion of contaminated soil	Unlikely No exceedances were identified in off-site locations.
		Inhalation of contaminated soil or dust from disturbed soils	Unlikely No exceedances were identified in off-site locations and are unlikely to generate airborne risks for off-site users.
	Ecosystem surrounding the site	Direct contact with contaminated soil	Unlikely No exceedances of ecological exposure criteria have been identified in off-site soils, including samples collected from SS09, located approximately 30 m north-east of the site.
		Ingestion of contaminated soil	Unlikely No exceedances were identified in off-site locations.
		Bioaccumulation through indirect contact	Unlikely While some exceedances were identified on-site no exceedances were identified in off-site locations.
	Groundwater beneath impacted soil	Rainwater/surface runoff leaching impacted soil followed by migration through porous media into groundwater	Confirmed Although no impacted soils exceeding the adopted criteria were identified off-site, off-site groundwater samples (MW04, MW05, MW06) confirm PFAS migration from the site. The highest concentration (110 µg/L Sum PFHxS and PFOS) was detected at MW04, south-west of the site, suggesting downgradient impacts.
PFAS-impacted groundwater	People using groundwater for drinking purposes	Consumption of contaminated groundwater	Unlikely No registered groundwater wells within a 2 km radius of the site had TDS values below 1,200 mg/L, which is deemed suitable for domestic and primary irrigation purposes (Gov SA 2015). The potable use of groundwater is therefore precluded.
	People using groundwater for irrigation of edible vegetation with which they grow produce for consumption	Consumption of edible vegetation irrigated by contaminated groundwater	Unlikely High TDS levels in groundwater preclude its use for irrigation. PFAS exposure through irrigated edible vegetation is not anticipated.
	People growing edible vegetation in open soil which may interact with groundwater	Consumption of PFAS impacted edible vegetation	Unlikely The proximity of residential properties in relation to the groundwater plume could allow for the uptake of shallow PFAS-impacted groundwater by larger fruit trees. Although PFAS concentrations above the adopted ecological criteria were recorded at MW06 (down-hydraulic gradient of the site), human health exposure risks via this pathway are considered unlikely, considering PFAS groundwater concentrations are below drinking

Potential Source	Potential Receptor	Exposure Pathway	Risk from exposure through SPR Linkages
			water standards. MW05 is representative of groundwater directly up-hydraulic gradient of residential properties in the preferential flow direction.
	People using groundwater for recreational purposes such as filling of swimming pools	Incidental ingestion of contaminated groundwater	Unlikely Although several private swimming pools are located near the site (e.g., 25–50 m to the north and east), no registered wells exist in the vicinity for recreational use.
	Downgradient, off-site maintenance and sub-surface construction workers that contact PFAS contaminated groundwater	Direct dermal contact or incidental ingestion of contaminated groundwater	Unlikely PFAS contamination in groundwater at off-site monitoring wells (MW04, MW05, MW06) is confirmed. However, routine activities by maintenance and sub-surface construction workers are unlikely to involve significant contact or ingestion of groundwater. The depth of contamination (~2 m bgl) and limited direct interaction with groundwater reduce the likelihood of exposure. Continuous monitoring of PFAS concentrations and migration pathways is recommended to ensure that the risk remains minimal as contamination migrates downgradient.
	Livestock watering, aquaculture or human consumption of aquatic foods	Abstraction of groundwater	Unlikely Groundwater in the area has high TDS values, exceeding suitability for domestic and irrigation purposes. For example, MW04 reported a TDS of 8,830 mg/L, which is well above the acceptable threshold of 1,200 mg/L for livestock watering and aquaculture (Gov SA 2015). This precludes the use of groundwater for these purposes.
	Migration of PFAS contaminated groundwater to downgradient marine receptors	Incidental ingestion of contaminated water	Possible The migration of PFAS-contaminated groundwater toward Spencer Gulf is plausible. Off-site well MW04, reported the highest PFAS concentrations (110 µg/L Sum PFHxS and PFOS). Given the shallow groundwater levels and proximity of the site to Spencer Gulf, direct discharge into marine waters cannot be ruled out. However, further delineation of the groundwater impacts between MW04 and the Spencer Gulf is required to assess the degree of migration and potential risks to marine receptors.
PFAS-impacted surface waters (off-site)	People using coastal waters for swimming	Incidental ingestion of contaminated groundwater	Unlikely While PFAS exceedances in surface water samples (SW03, 0.076 µg/L Sum PFHxS and PFOS) exceed ecological criteria for 99% species protection, they are below thresholds for human health risks. Dilution effects in marine environments further mitigate risks to recreational users.
	People fishing from coastal waters	Consumption of PFAS contaminated biota	Possible PFAS bioaccumulation in higher-order marine species (e.g., fish, crustaceans) remains a concern. Elevated PFAS levels in surface water (SW03) may contribute to bioaccumulation, particularly in areas downgradient from the site. However, further delineation of the groundwater impacts between MW04 and the Spencer Gulf is required to assess the degree of migration and potential risks to marine receptors.

Potential Source	Potential Receptor	Exposure Pathway	Risk from exposure through SPR Linkages
	Marine ecosystems downstream from the site	Discharge of PFAS impacted surface water into the marine environment	Possible Elevated PFAS concentrations in surface water at SW03 (0.076 µg/L) highlight risks to marine ecosystems near Spencer Gulf. Further investigation into surface water migration and potential interactions with marine waters is necessary to quantify ecological risks. Further delineation of the groundwater impacts between MW04 and the Spencer Gulf is required to assess the degree of migration and potential risks to marine receptors.

10. Existence of site contamination

Based on the information presented in this supplementary DSI report, PFAS-impacted soil contamination hotspots exist on-site. Site contamination also exists in relation to the quaternary aquifer underlying the site.

Section 5B from the *Environment Protection (Site Contamination) Amendment Act 2007* (EP Act) states that:

1. For the purposes of the Act, site contamination exists at a site if:
 - a. chemical substances are present on or below the surface of the site in concentrations above the background concentrations (if any); and
 - b. the chemical substances have, at least in part, come to be present there as a result of an activity at the site or elsewhere; and
 - c. the presence of the chemical substances in those concentrations has resulted in:
 - i. actual or potential harm to the health or safety of human beings that is not trivial, taking into account current or proposed land uses; or
 - ii. actual or potential harm to water that is not trivial; or
 - iii. other actual or potential environmental harm that is not trivial, taking into account current or proposed land uses.

It is understood that the SA EPA were notified, under Section 83A of the Environment Protection Act 1993, of groundwater PFAS impacts on the 30 October 2024.

11. Discussion

11.1 PFAS soil impacts

On-site

The on-site soil analysis indicates minimal PFAS contamination across most sampling locations, with no exceedances of human health assessment criteria. PFOS and PFHxS concentrations were generally below the ecological indirect exposure threshold for developed areas at most sites. However, exceedances were previously recorded at BH01, BH07 (former DSI) and most recently at BH09 (supplementary DSI) where cumulative PFAS concentrations (0.14 to 0.28 mg/kg) exceeded the ecological indirect exposure assessment criteria for developed sites.

Historical data identified elevated PFAS concentrations in the southern portion of the site, particularly in the former training area, where surface and near-surface soils were impacted by historical use of AFFF. While concentrations in surface soils remain below human health criteria, indicating negligible risk for human exposure, these on-site exceedances highlight potential ecological risks.

The depth range of exceedances in soil ranged from the surface to 1.6 m bgl which minimises direct human exposure pathways, such as dermal contact or incidental ingestion. However, the potential for PFAS interaction with plant roots and subsequent bioavailability to local vegetation and fauna exists. The presence of infrastructure such as concrete pads across portions of the site may restrict further vertical migration and reduce bioavailability in other areas, but this localised exceedance requires further evaluation.

The current findings suggest that on-site contamination is contained within localised areas and does not exhibit significant surface-level dispersion.

Off-site

The current investigation found no evidence of PFAS migration beyond the site boundaries. Soil samples collected at and near the site boundary, including areas adjacent to BH09 and soil collected during drilling of groundwater wells, did not exceed ecological or human health assessment criteria. This indicates that PFAS contamination remains localised within the site, with no immediate risks to off-site receptors.

Human health risks remain negligible due to the depth of contamination and the absence of direct exposure pathways.

11.2 PFAS groundwater impacts

On-site

The on-site groundwater results indicate potential down-hydraulic gradient ecological risks associated with elevated PFAS concentrations, particularly PFOS and PFHxS, migrating off-site. The highest combined PFOS and PFHxS concentration of 6.92 µg/L at MW02, as well as 2.14 µg/L and 3.98 µg/L at MW01 and MW03, respectively, emphasises the persistent nature of PFAS in the shallow aquifer beneath the site. These concentrations are likely associated with historical AFFF use in the southern training area, which has contributed to localised contamination of groundwater.

The presence of elevated PFAS concentrations in groundwater beneath the site creates ecological risks through potential discharge to downgradient receptors, such as adjacent vegetated areas or surface water bodies. PFAS compounds, especially PFOS and PFHxS, are highly persistent, bioaccumulative, and toxic to aquatic organisms. Although the site is not directly connected to surface water within its boundaries, the potential for migration to nearby ecosystems requires further assessment and ongoing monitoring. Vegetated areas around the site, where shallow groundwater may intersect with plant root zones, pose additional risks of bioaccumulation in terrestrial and semi-aquatic species.

Off-site

The off-site groundwater results reveal potential down-hydraulic gradient ecological risks, particularly considering the elevated PFOS and PFHxS concentrations at MW04 (110 µg/L). These levels surpass the adopted marine water criteria for both 99% species protection (0.00023 µg/L) and recreational water use (0.7 µg/L). The proximity of MW04 to potential marine discharge points, such as the Spencer Gulf, potentially poses ecological risks in aquatic environments. PFAS compounds are water-soluble and have a high propensity to bioaccumulate in marine organisms which can have an impact aquatic ecosystems and food chains. However, practical delineation has potentially been achieved between the impacts identified in MW04 and downgradient well MW06. This is supported by the concentrations present in MW06 being similar to those in upgradient well MW05 (ambient). Further, given that area between MW04 and MW06 is commercial industrial and includes the rail corridor there are no significant receptors within this area.

Lower PFAS concentrations were observed at MW05 (upgradient) and MW06 (downgradient), with combined PFOS and PFHxS concentrations of 0.0442 µg/L and 0.0991 µg/L, respectively. Despite being lower, these concentrations still exceed marine water ecological criteria, highlighting the persistence of PFAS as a contaminant of concern in the environment. Considering the distance of MW05 (130 m upgradient) from the site, the PFAS concentrations at this well are representative of ambient levels, indicative of the widespread and pervasive nature of PFAS contamination in the environment. Potentially, other upgradient sources are contributing to the ambient concentrations observed in MW05. Similarly, the cumulative impact of other potential downgradient sources on MW06 cannot be discounted, in view of the ubiquitous nature of PFAS.

11.3 PFAS surface water impacts

The surface water results reveal localised PFAS impacts, with the highest Sum of PFHxS and PFOS concentrations at SW03 (0.0760 µg/L), exceeding marine water protection criteria for 99% species protection. The contamination likely originates from surface runoff or subsurface migration linked to historical AFFF use. Elevated PFAS levels at SW03 pose ecological risks, where bioaccumulation and biomagnification may affect the vitality of the organisms. Lower concentrations at SW01 and SW02 (0.0107 µg/L and 0.0166 µg/L) suggest a gradient of contamination, though they still exceed ecological thresholds. While recreational water thresholds remain unbreached the ecological risks are significant. Migration and transport to sensitive marine environments, such as the Spencer Gulf is considered plausible.

It should be noted that water collected from the outlet of the hose connected to the on-site hydrant (SW_HYDRANT) recorded trace PFOS concentrations of 0.0008µg/L. Detections in the hydrant sample are possibly attributable to PFAS constituents in fire hose fabrication material, which the water was in contact with prior to discharge and sample collection.

12. Conclusions and recommendations

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

- On-site soils showed minimal contamination with no exceedances of adopted human health criteria. However, historical and current soil data indicate that PFAS concentrations exceed ecological indirect exposure assessment criteria at depths extending from surface to 1.6m bgl, presenting potential ecological risks associated with PFAS bioavailability and bioaccumulation in vegetated areas on-site.
- On-site groundwater wells exhibited elevated PFAS concentrations, exceeding ecological protection criteria. Potential exposure risks to downgradient ecosystems via the groundwater pathway can therefore not be precluded at this stage.
- Elevated PFAS concentrations were recorded at MW04 (located directly south of the site), exceeding the recreational water, drinking water and marine water ecological protection criteria.
- PFAS concentrations at the up-hydraulic gradient MW05 represents background / ambient conditions, indicating the widespread and pervasive nature of PFAS contamination in the environment. The presence of other upstream sources is likely contributing to the observed background / ambient concentrations, further demonstrating the cumulative and persistent nature of PFAS impacts.
- MW06, located further downgradient of MW04, reported PFAS concentrations similar to those observed in MW05, however still in excess of the stringent marine water ecological criteria for 99% species protection. However, it is unclear if the site is contributing to this. Further, given these observations, practical delineation of downgradient groundwater impacts has potentially been achieved between MW04 and MW06.
- Surface water results showed localised exceedances of marine ecological thresholds, particularly at SW03, with lower levels observed at SW01 and SW02. These results are potentially indicative of other PFAS sources in the area, considering SW01 and SW02 samples were collected on or directly adjacent to the site.
- While direct human health risks from recreational water use are minimal, ecological risks are plausible due to potential PFAS transport into marine ecosystems.
- The potential risk of bioaccumulation and biomagnification in aquatic ecosystems cannot be discounted at this stage, as ecological exposure risks on marine food webs via the surface water pathway is plausible given the close proximity of the site to the Spencer Gulf, however not confirmed.
- The analytical results indicate localised PFAS contamination in soil on-site and residual groundwater impacts, with potential ecological impacts emerging as the primary concern.

To mitigate the potential ecological and human health exposure risks the following recommendations are proposed:

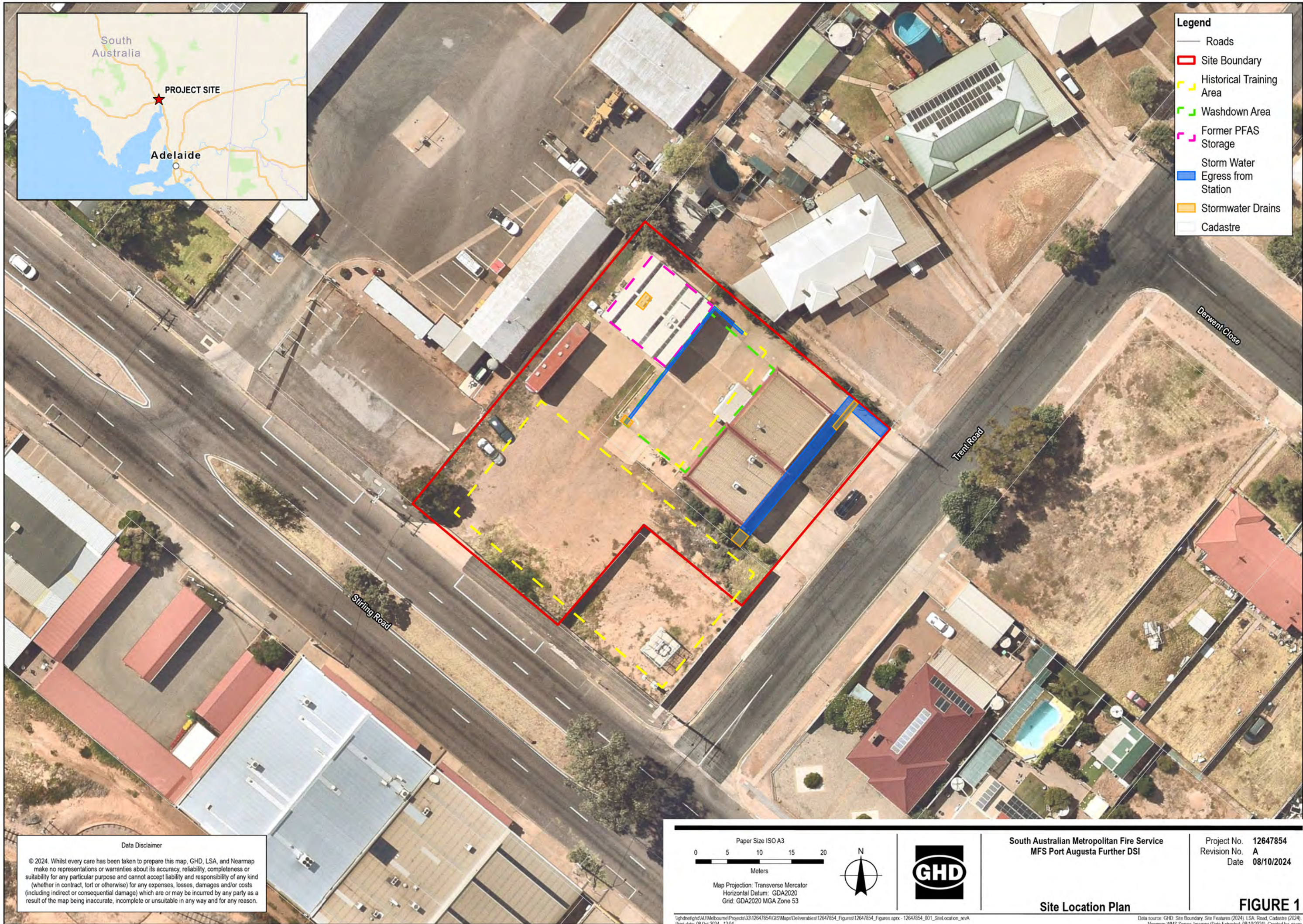
- Expand surface water monitoring to better understand the surface water migration pathways, particularly the potential discharge points to marine environments like the Spencer Gulf.
- Establish additional surface water monitoring locations along potential runoff and discharge pathways to track PFAS migration from the site into nearby aquatic environments, including streams, drainage systems, and marine ecosystems such as the Spencer Gulf.
- Following additional assessment of the surface water migration pathways and possible extent, a targeted ecological risk assessment to evaluate bioaccumulation and biomagnification potential in on-site terrestrial and off-site aquatic ecosystems may be required.
- Continue routine monitoring of groundwater, and surface water for PFAS concentrations at key locations, including on-site wells (MW01, MW02, MW03) and off-site wells (MW04, MW05, MW06). At this stage practical delineation of the groundwater impacts has potentially been achieved between wells MW04 and MW06. While it is likely the groundwater impacts extend beyond MW04, they have not reached MW06. Further, the concentrations in MW06 are similar to those present in MW05 which is considered to represent the background conditions surrounding the site.
- If required, establish community engagement by informing local stakeholders and communities about the results of the investigation and ongoing efforts to manage PFAS contamination.

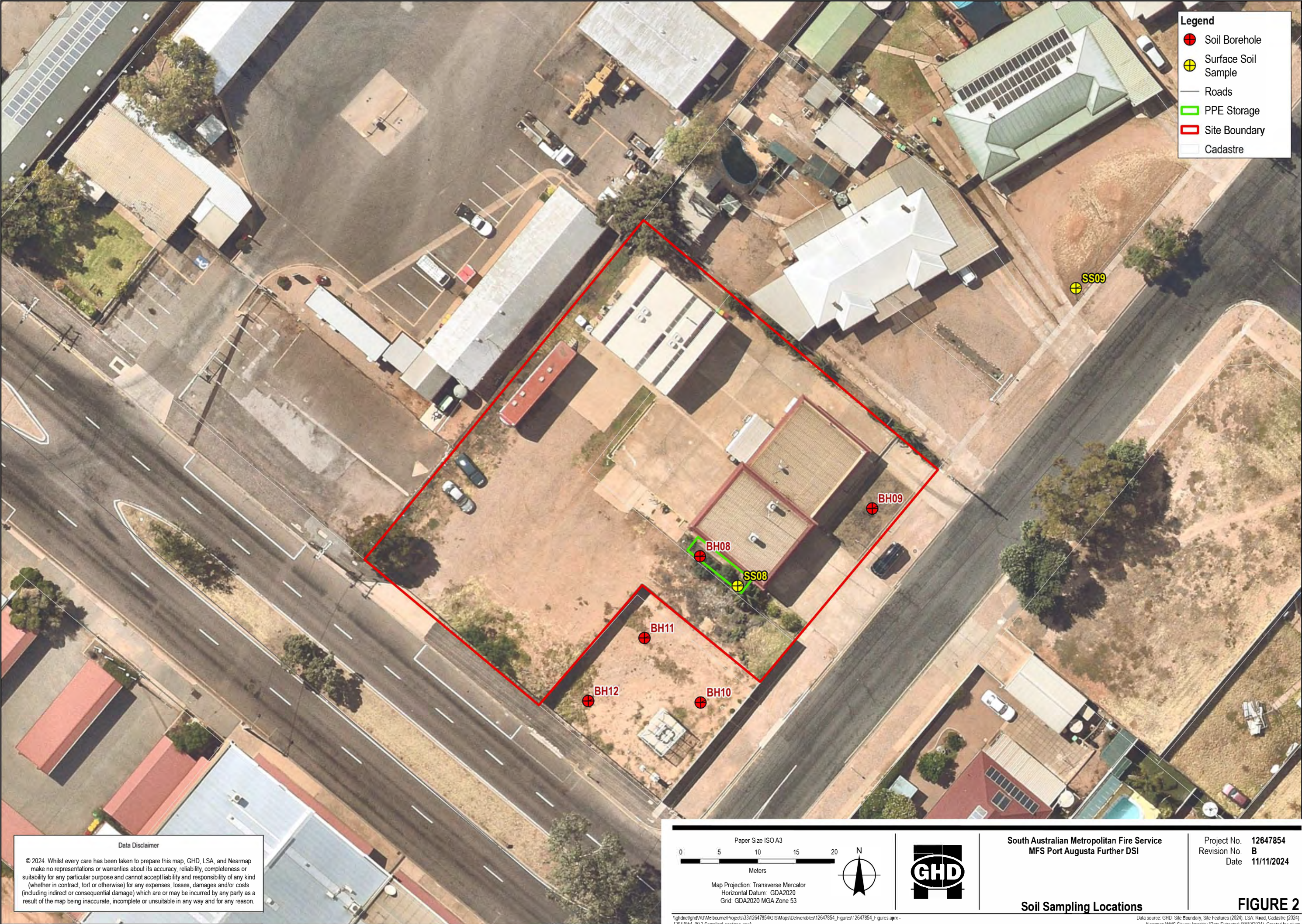
13. References

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Figures

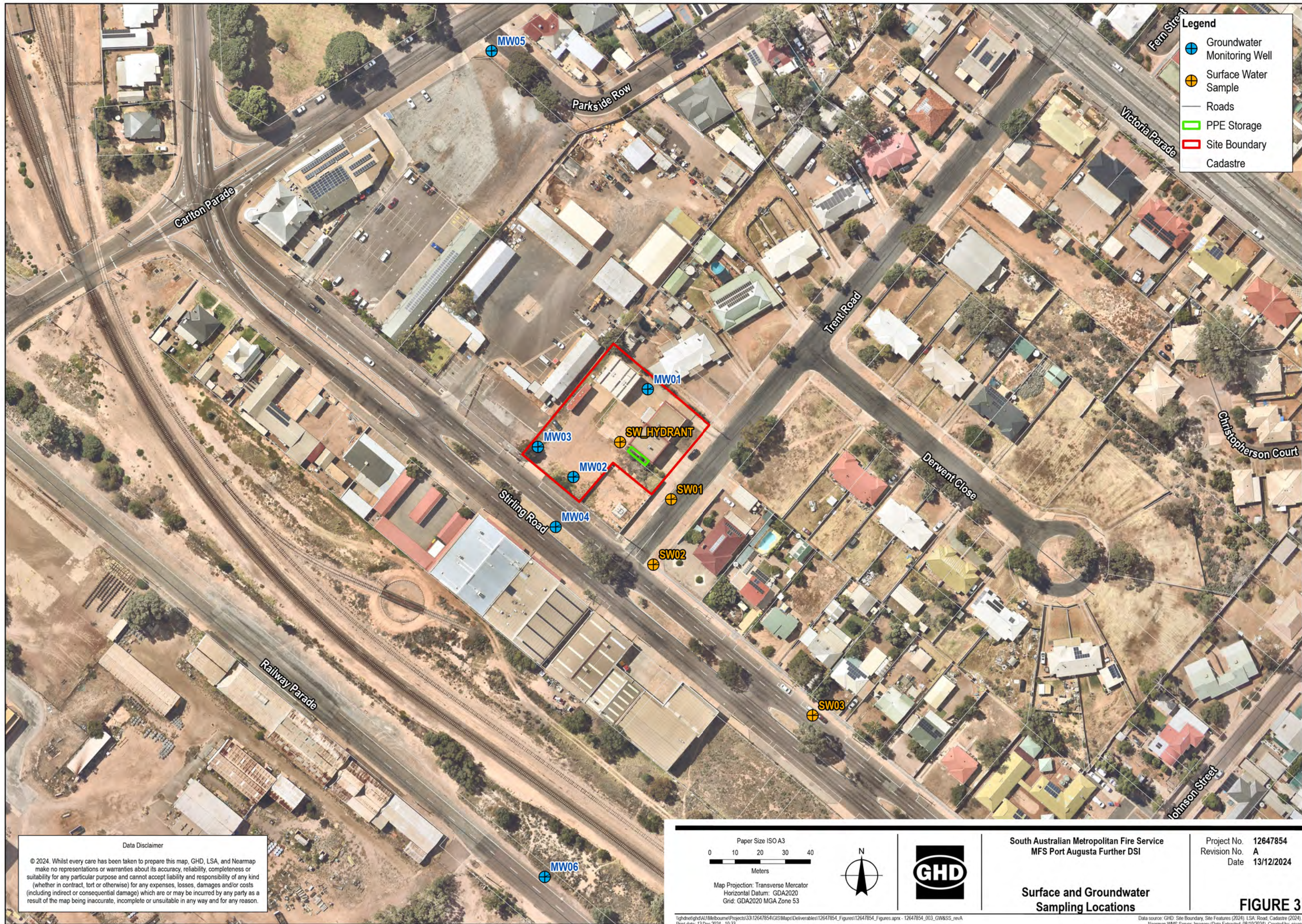
<i>Figure 1</i>	<i>MFS Port Augusta Site Location Plan</i>
<i>Figure 2</i>	<i>MFS Port Augusta Soil Sampling Locations</i>
<i>Figure 3</i>	<i>MFS Port Augusta Surface and Groundwater Sampling Locations</i>
<i>Figure 4</i>	<i>MFS Port Augusta Interpolated Groundwater Contour Map</i>
<i>Figure 5</i>	<i>MFS Port Augusta Soil Exceedances of Adopted Criteria</i>
<i>Figure 6</i>	<i>MFS Port Augusta Groundwater and Surface Water Exceedances of Adopted Criteria</i>
<i>Figure 7</i>	<i>MFS Port Augusta Conceptual Site Model</i>
<i>Figure 8</i>	<i>MFS Port Augusta Conceptual Site Model Cross Section</i>





Data Disclaimer

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- Legend**
- Groundwater Monitoring Well
 - Surface Water Sample
 - Roads
 - PPE Storage
 - Site Boundary
 - Cadastre

Paper Size ISO A3
0 10 20 30 40
Meters
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 53



South Australian Metropolitan Fire Service
MFS Port Augusta Further DSI

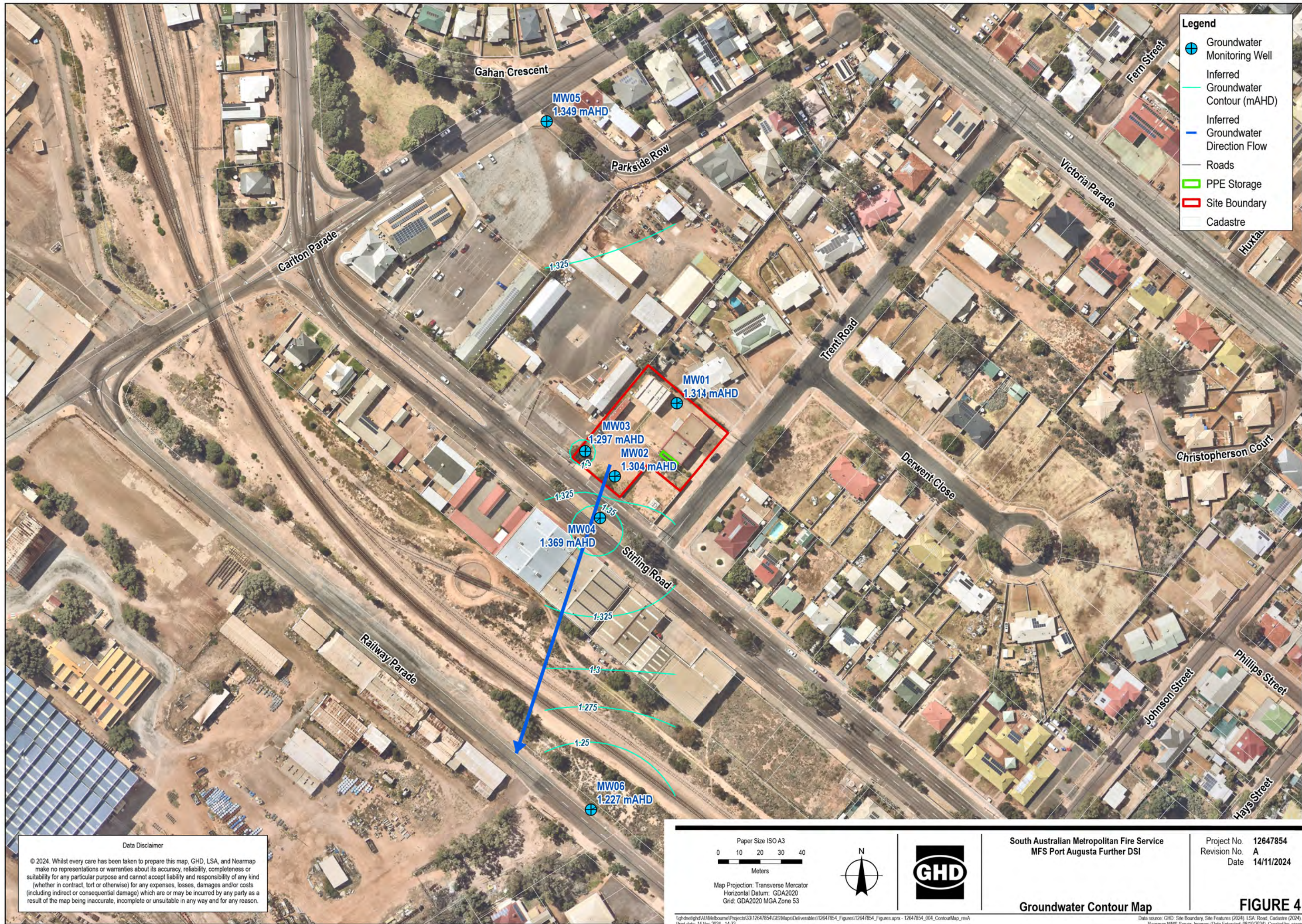
Surface and Groundwater
Sampling Locations

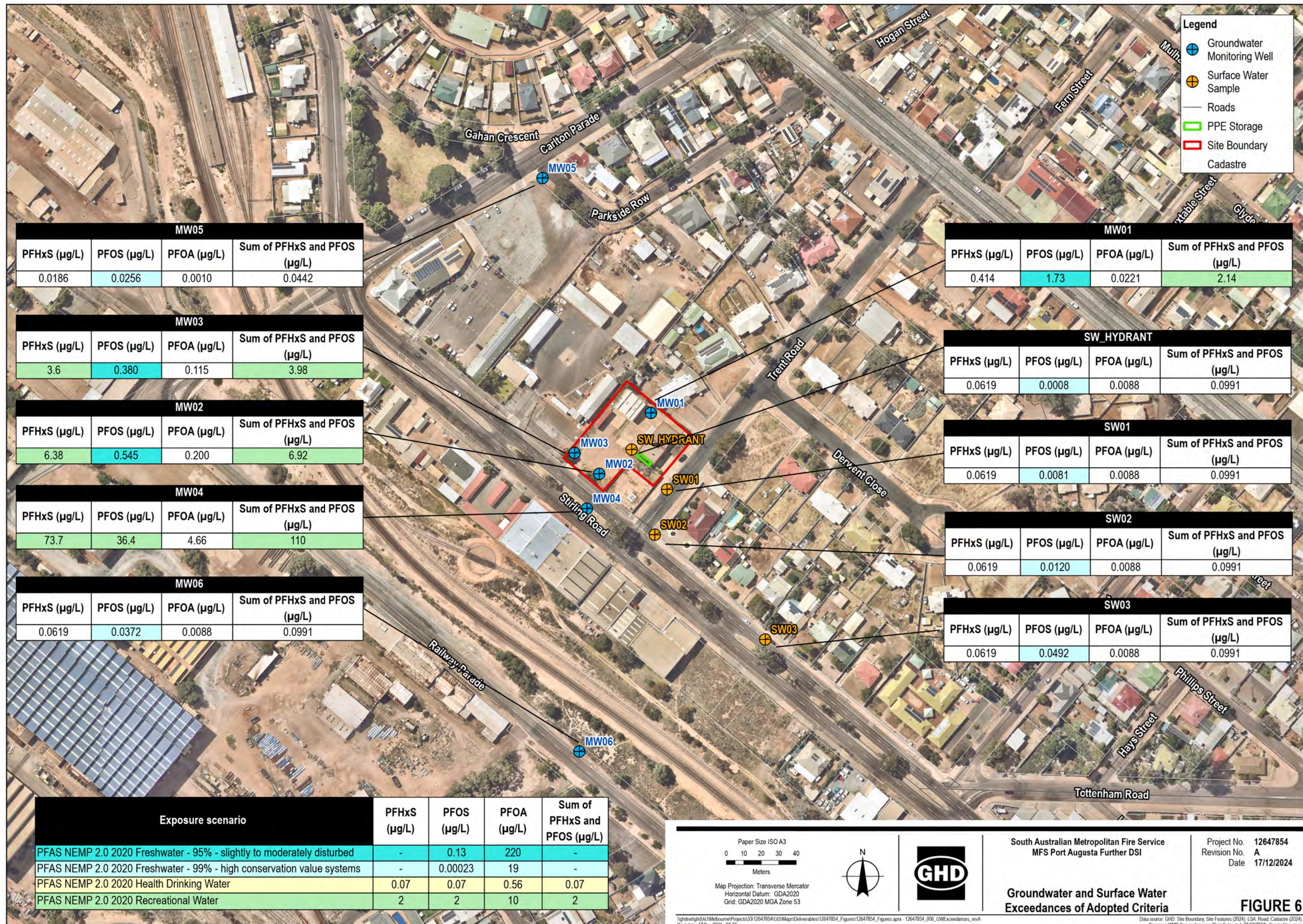
Project No. 12647854
Revision No. A
Date 13/12/2024

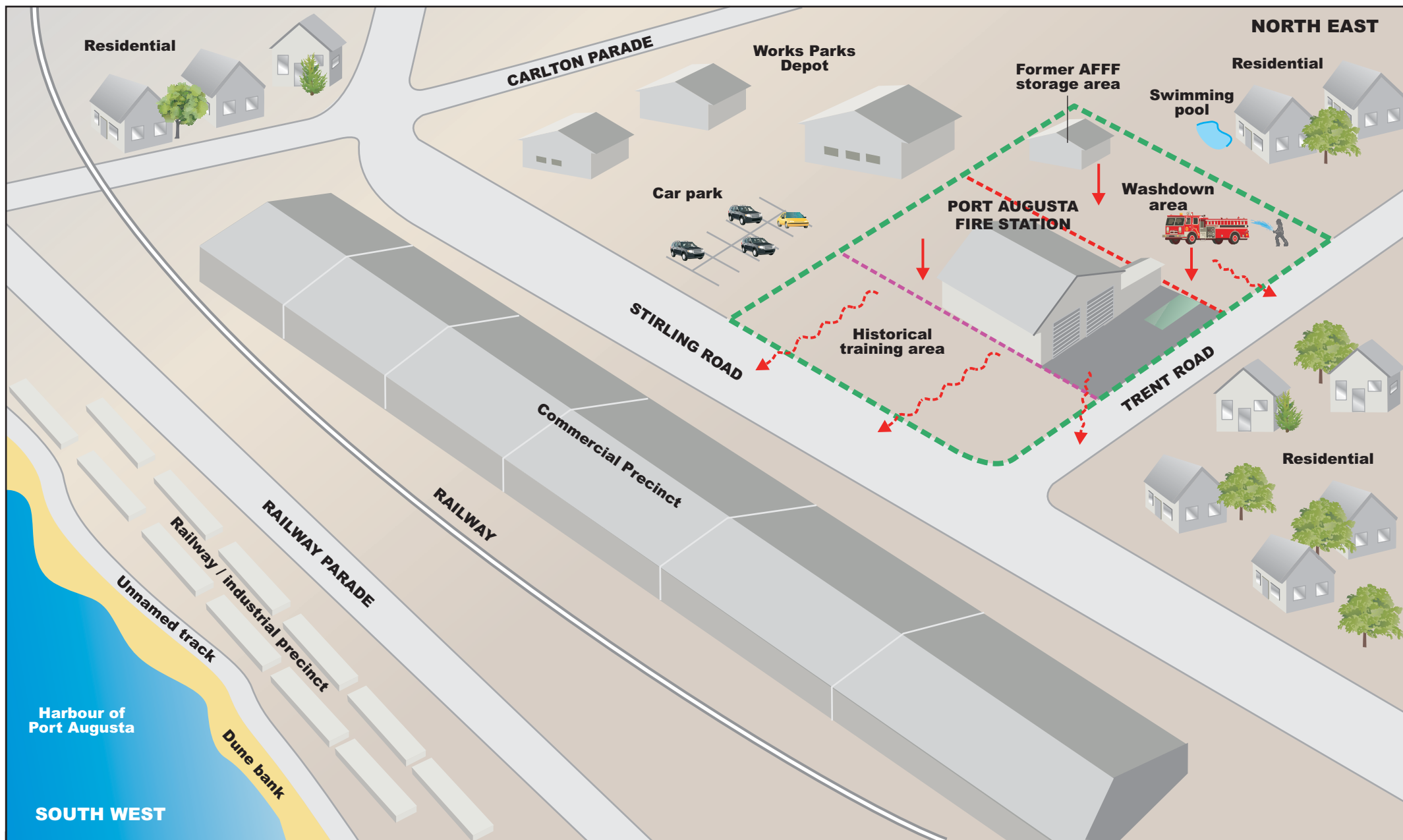
FIGURE 3

\\ghdnet\ghd\A\Melbourne\Projects\33\12647854\GIS\Map\Deliverables\12647854_Figures\12647854_Figures.aprx - 12647854_003_GW&SS_revA
Print date: 13 Dec 2024 - 10:33
Data source: GHD; Site Boundary; Site Features (2024); LSA; Road; Cadastre (2024)
Hearmap WMS Server; Imagery (Date Extracted: 08/10/2024); Created by: ejan

Data Disclaimer
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LEGEND

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

Conceptual diagram only -
not to scale



SA MFS
Port Augusta DSI
1 Trent Road, Port Augusta, SA 5700

Conceptual site model

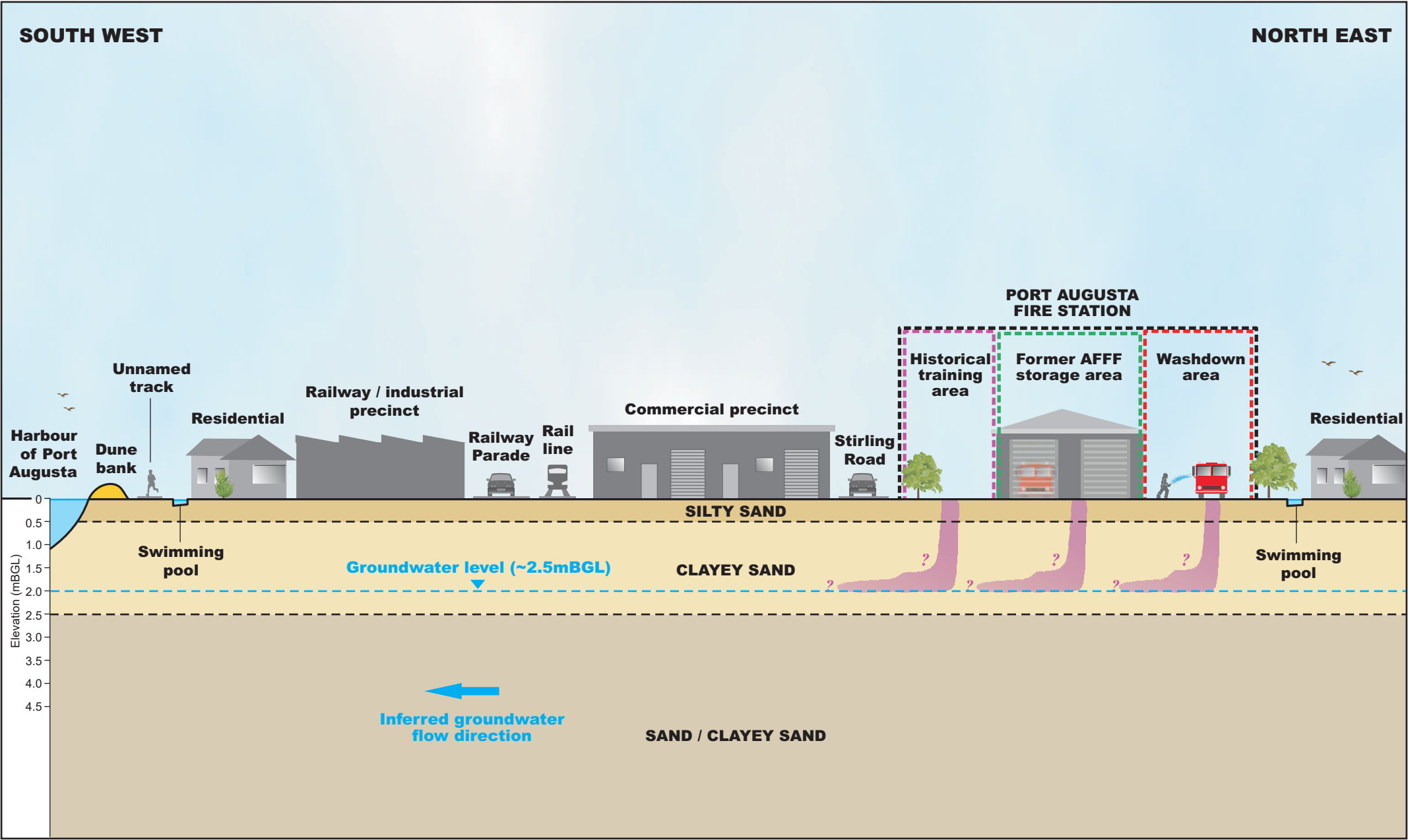
Project No. 12616805
Revision No. A
Date 29/11/2023

FIGURE 7

AU\Launceston\Projects\Admin\Graphics\12616805\12616805_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 ademail@ghd.com W www.ghd.com



LEGEND
 Inferred PFAS

Conceptual diagram only -
 scale is approximate



SA MFS
 Port Augusta DSI
 1 Trent Road, Port Augusta, SA 5700
**Conceptual site model
 cross section**

Project No. 12616805
 Revision No. A
 Date 29/11/2023

FIGURE 8

Appendices

Appendix A

SA EPA Letter

OFFICIAL



Environment Protection Authority

GPO Box 2607 Adelaide SA 5001

T (08) 8204 2004

Country areas 1800 623 445

EPA GENI 63248

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

Dear Ms Mitchell,

RE: REVIEW OF SITE CONTAMINATION REPORT – ACTION REQUIRED

Site: Port Augusta Fire Station, 1 Trent Road, Port Augusta SA 5700 (CR 5759/680)

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

- *MFS Port Augusta Station Detailed Site Investigation, South Australian Metropolitan Fire Service*, prepared by GHD and dated 8 March 2024.

Details of this report have been recorded in the EPA Public Register¹. This information will be made available to interested parties upon written enquiry to the Public Register Administrator of the EPA and will be included in the Public Register Index on the EPA website (<http://www.epa.sa.gov.au>). The information will also be available to all prospective purchasers of the site in the Form 1 of the Regulations under the *Land and Business (Sale and Conveyancing) Act 1994* (refer to the 'Particulars Relating To Environment Protection'), and through Section 7 statements.

Based on the information included in the report the site has been deemed to be a Level 1 regulatory priority in accordance with the EPA Site Contamination Regulatory Framework². This priority level assists the EPA in selecting the appropriate regulatory approach and reporting timeframe to ensure that site contamination is managed effectively.

As such, the EPA recommends that you engage a suitably qualified consultant to undertake assessment to achieve the following EPA goals:

- o Goal 2: Determine nature and extent of site contamination, and
- o Goal 3: Identify and assess any potential risks to human health or the environment.

To achieve the above goals the investigations conducted should specifically include:

- Delineating the nature and extent of the contamination in soil and groundwater onsite and offsite.
- Conducting a groundwater-use survey within the vicinity of the site.
- Development of a community engagement plan, if offsite investigations are planned.
- Investigations to determine whether surface water migrating from the site is impacting receiving waters and presenting a risk to ecological receptors.

Please provide the EPA with a report documenting the above investigations by **31 March 2025**.

¹ In accordance with section 109(3)(i) of the *Environment Protection Act 1993*

² https://www.epa.sa.gov.au/files/15469_sc_regulatory_framework.pdf

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

The EPA advises that stormwater and wastewater management at MFS sites may benefit from a review to ensure that activities undertaken at the site (including the wash down of vehicles) complies with the general environmental duty³. Onsite stormwater management may also assist in preventing the potential migration of PFAS from MFS sites to stormwater and ultimately to sensitive receiving environments during rain events.

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

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

Yours sincerely



Hannah Custance

PRINCIPAL ADVISER, SITE CONTAMINATION

ENVIRONMENT PROTECTION AUTHORITY

Date: 19 June 2024

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

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

³ Section 25 of the Act

Appendix B

Well Permits

Well Permit

Permit to undertake a Water Affecting Activity

Pursuant to section 112 of the Landscape South Australia Act 2019

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



Permission is hereby granted to

GHD Pty Ltd

Permit Number: **P-503508**

Permit Term: **2 year(s)**

Expiry Date: **23 August 2026**

To undertake the following water affecting activity

Activity **Construct a new well**
Well Use **Monitoring or Investigation**
At location **137.76984166900002,-32.49835247499999**
CT6047/315, D77909A64

Conditions

- 270043 WAA-100 - The activity authorised by this permit must only be undertaken on the land identified as follows:
CT6047/315 D77909 A64
- 270044 WAA-102 - The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, shall not adversely affect the quality of an underground water resource.
- 270045 WAA-103 - Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.
- 270050 WAA-110 - The authorised activity must be undertaken by a licensed driller.
- 270058 WAA-318 - The well driller must submit a Well Completion Report to the Department within 30 days of completion of each activity authorised by this well construction permit.
- 270046 WAA-105 - Water samples are required from all wells drilled in respect of this permit.
- 270051 WAA-111 - If the well is considered unsatisfactory, it may be abandoned and a replacement well may then be constructed provided that the abandoned well is backfilled prior to the drill rig leaving the site.
- 270047 WAA-106 - Strata samples are not required.
- 270048 WAA-107 - The licensed well driller must forward with the report a plan obtained from the permit holder, who must mark thereon the location of all wells drilled in respect of this permit.
- 270049 WAA-108 - All wells must be drilled vertical unless written permission is obtained from the Minister.
- 270052 WAA-124 - If the extracted groundwater supply is required for human consumption, it is recommended that the water be quality tested.
- 270053 WAA-133 - All groundwater extracted during sampling and/or purging must be contained and disposed of in an appropriate manner to minimise risk to health and the environment.
- 270054 WAA-134 - This permit does not authorise the taking of water from the well for any purpose other than testing.
- 270055 WAA-136 - Wells are to be backfilled when no longer required for ongoing monitoring or investigation purposes.
- 270056 WAA-137 - 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.
- 270057 WAA-149 - Due to known soil/groundwater contamination in the sediments and aquifers above, cautions should be taken in the drilling and cementing of this well.

AUTHORISATION: MINISTER FOR CLIMATE, ENVIRONMENT AND WATER

Date: 23 August 2024

Additional information about the site use approval

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

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

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

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

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

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

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

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

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

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

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

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

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

Well Permit

Permit to undertake a Water Affecting Activity

Pursuant to section 112 of the Landscape South Australia Act 2019

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



Permission is hereby granted to

GHD Pty Ltd

Permit Number: **P-503509**
Permit Term: **2 year(s)**
Expiry Date: **23 August 2026**

To undertake the following water affecting activity

Activity **Construct a new well**
Well Use **Monitoring or Investigation**
At location **137.770604413,-32.49637130299999**
CT5697/18, F217502A91

Conditions

- 270064 WAA-100 - The activity authorised by this permit must only be undertaken on the land identified as follows:
CT5697/18 F217502A91
- 270065 WAA-102 - The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, shall not adversely affect the quality of an underground water resource.
- 270066 WAA-103 - Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.
- 270071 WAA-110 - The authorised activity must be undertaken by a licensed driller.
- 270080 WAA-318 - The well driller must submit a Well Completion Report to the Department within 30 days of completion of each activity authorised by this well construction permit.
- 270067 WAA-105 - Water samples are required from all wells drilled in respect of this permit.
- 270072 WAA-111 - If the well is considered unsatisfactory, it may be abandoned and a replacement well may then be constructed provided that the abandoned well is backfilled prior to the drill rig leaving the site.
- 270068 WAA-106 - Strata samples are not required.
- 270069 WAA-107 - The licensed well driller must forward with the report a plan obtained from the permit holder, who must mark thereon the location of all wells drilled in respect of this permit.
- 270070 WAA-108 - All wells must be drilled vertical unless written permission is obtained from the Minister.
- 270073 WAA-124 - If the extracted groundwater supply is required for human consumption, it is recommended that the water be quality tested.
- 270074 WAA-133 - All groundwater extracted during sampling and/or purging must be contained and disposed of in an appropriate manner to minimise risk to health and the environment.
- 270075 WAA-134 - This permit does not authorise the taking of water from the well for any purpose other than testing.
- 270076 WAA-136 - Wells are to be backfilled when no longer required for ongoing monitoring or investigation purposes.
- 270077 WAA-137 - 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.
- 270078 WAA-143 - This permit authorises the construction of a well on the portion of road adjacent to the land parcel described above.
- 270079 WAA-149 - Due to known soil/groundwater contamination in the sediments and aquifers above, cautions should be taken in the drilling and cementing of this well.

AUTHORISATION: MINISTER FOR CLIMATE, ENVIRONMENT AND WATER

Additional information about the site use approval

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

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

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

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

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

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

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

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

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

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

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

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

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

Well Permit

Permit to undertake a Water Affecting Activity

Pursuant to section 112 of the Landscape South Australia Act 2019

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



Permission is hereby granted to

GHD Pty Ltd

Permit Number: **P-503510**

Permit Term: **2 year(s)**

Expiry Date: **23 August 2026**

To undertake the following water affecting activity

Activity	Construct a new well
Well Use	Monitoring or Investigation
At location	137.77012633799995,-32.49780956799998 CT5293/708, H330600S21

Conditions

270086	WAA-100 - The activity authorised by this permit must only be undertaken on the land identified as follows: CT5293/708 H330600S21
270087	WAA-102 - The equipment, materials and methods used in drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, shall not adversely affect the quality of an underground water resource.
270088	WAA-103 - Aquifers shall be protected during drilling, plugging, backfilling or sealing of a well, or the replacement or alteration of the casing, lining or screen of a well, to prevent adverse impacts upon the integrity of the aquifer.
270093	WAA-110 - The authorised activity must be undertaken by a licensed driller.
270102	WAA-318 - The well driller must submit a Well Completion Report to the Department within 30 days of completion of each activity authorised by this well construction permit.
270089	WAA-105 - Water samples are required from all wells drilled in respect of this permit.
270094	WAA-111 - If the well is considered unsatisfactory, it may be abandoned and a replacement well may then be constructed provided that the abandoned well is backfilled prior to the drill rig leaving the site.
270090	WAA-106 - Strata samples are not required.
270091	WAA-107 - The licensed well driller must forward with the report a plan obtained from the permit holder, who must mark thereon the location of all wells drilled in respect of this permit.
270092	WAA-108 - All wells must be drilled vertical unless written permission is obtained from the Minister.
270095	WAA-124 - If the extracted groundwater supply is required for human consumption, it is recommended that the water be quality tested.
270096	WAA-133 - All groundwater extracted during sampling and/or purging must be contained and disposed of in an appropriate manner to minimise risk to health and the environment.
270097	WAA-134 - This permit does not authorise the taking of water from the well for any purpose other than testing.
270098	WAA-136 - Wells are to be backfilled when no longer required for ongoing monitoring or investigation purposes.
270099	WAA-137 - 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.
270100	WAA-143 - This permit authorises the construction of a well on the portion of road adjacent to the land parcel described above.
270101	WAA-149 - Due to known soil/groundwater contamination in the sediments and aquifers above, cautions should be taken in the drilling and cementing of this well.

AUTHORISATION: MINISTER FOR CLIMATE, ENVIRONMENT AND WATER

Additional information about the site use approval

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

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

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

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

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

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

Appendix C

Well Survey Results



To: Tom Duncan
Company: GHD
Phone: 0413 476 581

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

Date: 25/10/2024

Monitoring well coordinates – Port Augusta MFS

Well or Bore	Easting	Northing	R.L. Top of Casing	Natural Surface
No.	GDA20	GDA20	A.H.D.	A.H.D.
MW01	760324.826	6401044.765	4.314	4.388
MW02	760295.223	6401009.818	3.524	3.587
MW03	760281.067	6401021.830	3.556	3.636
MW04	760288.15	6400989.942	3.796	3.863
MW05	760262.667	6401179.437	7.297	7.426
MW06	760283.779	6400850.597	2.943	3.013

All Survey information was based from the GDA20 Z53 grid system and Australian Height Datum (AHD), Triangulated from Network Survey Marks.

Appendix D

Borehole Logs



BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH08

Page 1 of 8

Client SA MFS	Drill Co. WB Drilling Pty Ltd	Easting 760323.98
Project MFS Port Augusta Further DSI	Driller WB Drilling Pty Ltd	Northing 6401037.28
Project No. 12647854	Rig Type 4WD Mounted Rig	Grid Ref GDA94_MGA_zone_53
Site Port Augusta MFS	Total Depth (m) 2.00	Elevation 10m
Location Port Augusta	Diameter (mm) 50	Logged By SM, LW
Date Drilled 24/09/2024		Checked By TW

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)
0.1	PT		BH08 - 0-0.2			TOPSOIL/GRASSMAT	D	L	no odour no staining	-0.1
0.2										-0.2
0.3										-0.3
0.4			BH08 - 0.4			Silty SAND no plasticity, fine, well graded, pale red-brown, trace roots (FILL)	D	L	no odour no staining	-0.4
0.5			BH08 - 0.5							-0.5
0.6										-0.6
0.7										-0.7
0.8										-0.8
0.9						Silty SAND no plasticity, fine, well graded, dark red-brown (NATURAL - SOIL)	SM	D	no odour no staining	-0.9
1			BH08 - 1.0							-1
1.1										-1.1
1.2										-1.2
1.3										-1.3
1.4										-1.4
1.5			BH08 - 1.5							-1.5
1.6										-1.6
1.7										-1.7
1.8										-1.8
1.9										-1.9
2			BH08 - 2.0			Termination Depth at: 2.00 m. Target depth achieved.				-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 BH09

Page 2 of 8

Client SA MFS	Drill Co. WB Drilling Pty Ltd	Easting 760354.65
Project MFS Port Augusta Further DSI	Driller WB Drilling Pty Ltd	Northing 6401012.40
Project No. 12647854	Rig Type 4WD Mounted Rig	Grid Ref GDA94_MGA_zone_53
Site Port Augusta MFS	Total Depth (m) 2.00	Elevation 10m
Location Port Augusta	Diameter (mm) 50	Logged By SM, LW
Date Drilled 24/09/2024		Checked By TW

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)
0.1	PT		BH09 - 0 - 0.2			TOPSOIL/GRASSMAT Silty SAND no plasticity, fine, well graded, pale red-brown, some fine to medium gravel, subangular to subrounded, fine to medium, poorly graded gravel (FILL)	D	H	no odour no staining	-0.1
0.2										-0.2
0.3										-0.3
0.4			BH09 - 0.4							-0.4
0.5			BH09 - 0.5							-0.5
0.6						Silty SAND no plasticity, fine, well graded, angular to subangular, pale red- brown, trace coal, subangular to subrounded, medium, poorly graded gravel (NATURAL)	D	D	no odour no staining	-0.6
0.7										-0.7
0.8						Silty SAND no plasticity, fine, well graded, angular to subangular, pale red- brown, medium sand, subangular to subrounded, fine to medium, poorly graded gravel (NATURAL)	D	D	no odour no staining	-0.8
0.9										-0.9
1			BH09 - 1.0							-1
1.1										-1.1
1.2										-1.2
1.3										-1.3
1.4										-1.4
1.5			BH09 - 1.5							-1.5
1.6										-1.6
1.7										-1.7
1.8						Silty SAND no plasticity, fine, well graded, angular to subangular, pale red- brown, subangular to subrounded, fine to medium, poorly graded gravel (NATURAL)	SM	MD	no odour no staining	-1.8
1.9										-1.9
2			BH09 - 2.0			Termination Depth at: 2.00 m. Target depth achieved.				-2

Notes

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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 BH10

Page 3 of 8

Client SA MFS	Drill Co. WB Drilling Pty Ltd	Easting 760304.52
Project MFS Port Augusta Further DSI	Driller WB Drilling Pty Ltd	Northing 6401005.16
Project No. 12647854	Rig Type 4WD Mounted Rig	Grid Ref GDA94_MGA_zone_53
Site Port Augusta MFS	Total Depth (m) 2.00	Elevation 10m
Location Port Augusta	Diameter (mm) 50	Logged By SM, LW
Date Drilled 24/09/2024		Checked By TW

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)
0.1	PT		BH10 - 0 - 0.2			PROCESSED PIT GRAVEL	D	F	no odour no staining	-0.1
0.2						Silty SAND no plasticity, fine, poorly graded, angular to subangular, pale red- brown, trace fine to medium gravel (FILL)				-0.2
0.3										-0.3
0.4			BH10 - 0.4							-0.4
0.5			BH10 - 0.5							-0.5
0.6						Silty SAND no plasticity, fine, poorly graded, angular to subangular, pale red- brown (FILL)	D	D	no odour no staining	-0.6
0.7										-0.7
0.8										-0.8
0.9						Silty SAND no plasticity, fine, poorly graded, angular to subangular, pale red- brown (NATURAL)	D	D	no odour no staining	-0.9
1			BH10 - 1.0							-1
1.1										-1.1
1.2										-1.2
1.3										-1.3
1.4										-1.4
1.5			BH10 - 1.5							-1.5
1.6										-1.6
1.7										-1.7
1.8										-1.8
1.9						Silty SAND no plasticity, fine, well graded, angular to subangular, pale red- brown to tan (NATURAL)	SM	MD	no odour no staining	-1.9
2			BH10 - 2.0							-2

Notes

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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 BH11

Page 4 of 8

Client SA MFS	Drill Co. WB Drilling Pty Ltd	Easting 760324.62
Project MFS Port Augusta Further DSI	Driller WB Drilling Pty Ltd	Northing 6401022.17
Project No. 12647854	Rig Type 4WD Mounted Rig	Grid Ref GDA94_MGA_zone_53
Site MFS Port Augusta	Total Depth (m) 2.00	Elevation 10m
Location Port Augusta	Diameter (mm) 50	Logged By SM, LW
Date Drilled 24/09/2024		Checked By TW

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)
0.1	PT		BH11 - 0 - 0.2			PROCESSED PIT GRAVEL	D	D	no odour no staining	-0.1
0.2						Silty SAND no plasticity, fine to medium, poorly graded, angular to subangular, pale red- brown, some fine to medium gravel (FILL)				-0.2
0.3										-0.3
0.4			BH11 - 0.4							-0.4
0.5			BH11 - 0.5							-0.5
0.6						Silty SAND no plasticity, fine to medium, poorly graded, angular to subangular, pale red- brown, trace fine to medium gravel (NATURAL)	D	D	no odour no staining	-0.6
0.7										-0.7
0.8										-0.8
0.9										-0.9
1			BH11 - 1.0							-1
1.1										-1.1
1.2										-1.2
1.3										-1.3
1.4										-1.4
1.5			BH11 - 1.5							-1.5
1.6						Silty SAND no plasticity, fine to medium, poorly graded, angular to subangular, pale red- brown to tan (NATURAL)	SM	MD	no odour no staining	-1.6
1.7										-1.7
1.8										-1.8
1.9										-1.9
2			BH11 - 2.0							-2

Notes

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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-Push tube, 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 BH12

Page 5 of 8

Client SA MFS
Project MFS Port Augusta Further DSI
Project No. 12647854
Site MFS Port Augusta
Location Port Augusta
Date Drilled 24/09/2024

Drill Co. WB Drilling Pty Ltd
Driller WB Drilling Pty Ltd
Rig Type 4WD Mounted Rig
Total Depth (m) 2.00
Diameter (mm) 50

Easting 760339.11
Northing 6401015.36
Grid Ref GDA94_MGA_zone_53
Elevation 10m
Logged By SM, LW
Checked By TW

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)
0.1	PT		BH12 - 0 - 0.2			PROCESSED PIT GRAVEL Silty SAND no plasticity, fine, poorly graded, angular to subangular, pale red- brown, with coarse gravel (FILL)	D	D	no odour no staining	-0.1
0.2										-0.2
0.3										-0.3
0.4			BH12 - 0.4				D	D	no odour no staining	-0.4
0.5			BH12 - 0.5							-0.5
0.6										-0.6
0.7										-0.7
0.8										-0.8
0.9										-0.9
1			BH12 - 1.0							-1
1.1						Silty SAND no plasticity, fine, poorly graded, angular to subangular, pale red- brown to tan (NATURAL)	SM	MD	no odour no staining	-1.1
1.2										-1.2
1.3										-1.3
1.4										-1.4
1.5			BH12 - 1.5							-1.5
1.6										-1.6
1.7										-1.7
1.8										-1.8
1.9										-1.9
2			BH12 - 2.0							-2

Notes

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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-Push tube, 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- MONITORING WELL

MONITORING WELL MW04

Page 8 of 8

Client SA MFS	Drill Co. WB Drilling Pty Ltd	Easting 760296.32
Project MFS Port Augusta Further DSI	Driller WB Drilling Pty Ltd	Northing 6400982.73
Project No. 12647854	Rig Type 4WD Mounted Rig	Grid Ref GDA94_MGA_zone_53
Site MFS Port Augusta	Total Depth (m) 4.50	Elevation 10m
Location Port Augusta	Diameter (mm) 50	Logged By SM, LW
Date Drilled 23/09/2024		Checked By TW

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	HFA		MW04 - 0 -0.2			TOPSOIL			Sandy topsoil with gravel	-0.2
0.4			MW04 - 0.4			Silty SAND no plasticity, fine, well graded, rounded, pale brown and dark red (FILL)	D	L	no odour no staining	-0.4
0.6			MW04 - 0.5							-0.6
0.8										-0.8
1			MW04 - 1.0			Silty SAND no plasticity, fine, well graded, rounded, pale brown (NATURAL)	D	D	no odour no staining	-1
1.2										-1.2
1.4			MW04 - 1.5							-1.4
1.6										-1.6
1.8						Silty SAND low plasticity, fine, poorly graded, rounded, pale brown and mottled orange, trace fine gravel (NATURAL - SOIL)	D	D	no odour no staining	-1.8
2			MW04 - 2.0							-2
2.2										-2.2
2.4			MW04 - 2.5							-2.4
2.6										-2.6
2.8						Silty SAND low plasticity, fine, poorly graded, rounded, pale red to pale brown, trace clay (NATURAL - SOIL)	M	D	no odour no staining	-2.8
3			MW04 - 3.0							-3
3.2										-3.2
3.4			MW04 - 3.5							-3.4
3.6										-3.6
3.8						Silty SAND low plasticity, fine, poorly graded, rounded, to pale brown, trace clay (NATURAL - SOIL)	S	VL	no odour no staining	-3.8
4			MW04 - 4.0							-4
4.2										-4.2
4.4			MW04 - 4.5							-4.4
4.6						Termination Depth at: 4.50 m. Target depth achieved.				-4.6
4.8										-4.8

Notes

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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-Push tube, 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- MONITORING WELL

MONITORING WELL MW05

Page 6 of 8

Client SA MFS	Drill Co. WB Drilling Pty Ltd	Easting 760257.93
Project MFS Port Augusta Further DSI	Driller WB Drilling Pty Ltd	Northing 6401174.06
Project No. 12647854	Rig Type 4WD Mounted Rig	Grid Ref GDA94_MGA_zone_53
Site MFS Port Augusta	Total Depth (m) 7.00	Elevation 9m
Location Port Augusta	Diameter (mm) 50	Logged By SM, LW
Date Drilled 23/09/2024		Checked By TW

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)
0.5	HA		MW05 - 0- 0.2			TOPSOIL			Sandy topsoil with gravel and stones	
			MW05 - 0.4						no odour no staining	
			MW05 - 0.5							
1	SFA		MW05 - 1.0			Silty SAND no plasticity, fine, well graded, rounded, pale red (NATURAL)	D	D	no odour no staining	-1
1.5			MW05 - 1.5							
2			MW05 - 2.0			Silty SAND low plasticity, fine, poorly graded, rounded, pale red and pale orange, trace fine gravel (NATURAL - SOIL)	D	D	no odour no staining	-2
2.5			MW05 - 2.5							
3			MW05 - 3.0			Silty SAND low plasticity, fine, poorly graded, rounded, pale red to pale brown, trace clay (NATURAL - SOIL)	M	D	no odour no staining	-3
3.5			MW05 - 3.5							
4			MW05 - 4.0			Silty SAND low plasticity, fine, poorly graded, rounded, pale brown, trace clay (NATURAL - SOIL)	S	VL	no odour no staining	-4
4.5			MW05 - 4.5							
5			MW05 - 5.0			Termination Depth at: 7.00 m. Target depth achieved.				-5
5.5										-5.5
6										-6
6.5										-6.5

Notes

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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-Push tube, 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- MONITORING WELL

MONITORING WELL MW06

Page 7 of 8

Client SA MFS	Drill Co. WB Drilling Pty Ltd	Easting 760341.07
Project MFS Port Augusta Further DSI	Driller WB Drilling Pty Ltd	Northing 6400801.33
Project No. 12647854	Rig Type 4WD Mounted Rig	Grid Ref GDA94_MGA_zone_53
Site MFS Port Augusta	Total Depth (m) 4.00	Elevation 6m
Location Port Augusta	Diameter (mm) 50	Logged By SM, LW
Date Drilled 24/09/2024		Checked By TW

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	PT		MW06 - 0 - 0.2			TOPSOIL			Sandy topsoil with gravel and stones	-0.2
0.4			MW06 - 0.4			Silty SAND no plasticity, fine, well graded, rounded, pale brown and dark red (FILL)	D	L	no odour no staining	-0.4
0.6			MW06 - 0.5							-0.6
0.8										-0.8
1			MW06 - 1.0			Silty SAND low to medium plasticity, fine, well graded, rounded, pale red and pale yellow, trace fine gravel (NATURAL)	M	D	no odour no staining	-1
1.2										-1.2
1.4			MW06 1.5							-1.4
1.6						Silty SAND no plasticity, fine, well graded, rounded, pale yellow (NATURAL - SOIL)	W	L	no odour no staining	-1.6
1.8										-1.8
2			MW06 - 2.0							-2
2.2										-2.2
2.4			MW06 - 2.5							-2.4
2.6						Silty SAND low plasticity, fine, well graded, rounded, pale grey (NATURAL - SOIL)	W	L	no odour no staining	-2.6
2.8										-2.8
3			MW06 - 3.0							-3
3.2										-3.2
3.4			MW06 - 3.5							-3.4
3.6						Silty SAND no plasticity, fine, well graded, rounded, pale grey and mottled orange (NATURAL - SOIL)	W	L	no odour no staining	-3.6
3.8										-3.8
4			MW06 - 4.0							-4
						Termination Depth at: 4.00 m. Target depth achieved.				

Notes

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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-Push tube, 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 E

Laboratory Reports

4110, BL

LAB ID	SAMPLE DETAILS			NUMBER OF CONTAINERS	Additional Information
	SAMPLE ID	DATE	MATRIX		
	PFAS Soils	3/9/19	S	77	COC to be emailed
TOTAL					



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

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WOLLONGONG 99 Konny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkimbla@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date): 9/10/2024	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000	☐ Non Standard or urgent TAT (List due date):		
PROJECT: MFS Port Augusta Further DSI (12647854)	ALS QUOTE:	COC SEQUENCE NUMBER (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 MANAGER: Terrence Wilson	ORDER NO.:	COC: X 2 3 4 5 6 7 OF: 8	
SAMPLER: Louise Wright (LW), Sam Marsh (SM)	SAMPLER MOBILE: 0413 631 886	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	Louise Wright	
Email Reports to: GHDLabReports@ghd.com , terrence.wilson@ghd.com		DATE/TIME:	DATE/TIME:
Email Invoice to: GHDLabReports@ghd.com , terrence.wilson@ghd.com		30/09/2024, 8.30am	
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 Extended Suite - 30 PFAS (Standard LOR)	HOLD						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	MW04_0-0.2	23/09/2024	S		1	X							
2	MW04_0.4-0.5	23/09/2024	S		1		X						
3	MW04_1.0	23/09/2024	S		1		X						
4	MW04_1.5	23/09/2024	S		1		X						
5	MW04_2.0	23/09/2024	S		1		X						
6	MW04_2.5	23/09/2024	S		1		X						
7	MW04_3.0	23/09/2024	S		1	X							
8	MW04_3.5	23/09/2024	S		1		X						
9	MW04_4.0	23/09/2024	S		1		X						
10	MW04_4.5	23/09/2024	S		1		X						
TOTAL					10	2	8						

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:
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ADELAIDE 13/1 Burma Road Pooraka SA 5005
Ph: 08 8102 5130 E: adelaide@alsglobal.com
BRISBANE 32 Strand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLAISTONE 46 Callemondah Drive Clinton QLD 4680
Ph: 07 7471 5600 E: glainstone@alsglobal.com

MACKEY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2/4 Wollall Road Springvale VIC 3171
Ph: 03 8540 0600 E: samples.melbourne@alsglobal.com
MUDGE 27 Sydney Road Mudgee NSW 2850
Ph: 02 6372 0735 E: mudgee.mel@alsglobal.com

NEWCASTLE 5 Rose Gum Road Waratook NSW 2304
Ph: 08 9209 7655 E: samples.newcastle@alsglobal.com
PERTH 10 Hod Way Malaga WA 6060
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-299 Woodpark Road Smithfield NSW 2164
Ph: 02 8794 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Desma Court Bohia QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkemps@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS: ☐ Standard TAT (List due date): 9/10/2024	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: Level 4, 211 Victoria Square Adelaide SA 5000	☐ Non Standard or urgent TAT (List due date):	
PROJECT: MFS Port Augusta Further DSI (12647854)	ALSO QUOTE:	
PROJECT MANAGER: Terrence Wilson	CONTACT PH: 0467 034 756	
SAMPLER: Louise Wright (LW), Sam Marsh (SM)	SAMPLER MOBILE: 0413 631 886	
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	
Email Reports to: GHDLabReports@ghd.com , terrence.wilson@ghd.com	RELINQUISHED BY: Louise Wright	
Email Invoice to: GHDLabReports@ghd.com , terrence.wilson@ghd.com	DATE/TIME: 30/09/2024, 8.30am	
	RECEIVED BY:	
	DATE/TIME:	
	RELINQUISHED 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 Extended Suite - 30 PFAS (Standard LOR)	HOLD										Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
11	MW05_0-0.2	23/09/2024	S		1	X											
12	MW05_0.4-0.5	23/09/2024	S		1		X										
13	MW05_0.5	23/09/2024	S		1		X										
14	MW05_1.0	23/09/2024	S		1		X										
15	MW05_1.5	23/09/2024	S		1		X										
16	MW05_2.0	23/09/2024	S		1		X										
17	MW05_2.5	23/09/2024	S		1		X										
18	MW05_3.0	23/09/2024	S		1		X										
19	MW05_3.5	23/09/2024	S		1		X										
20	MW05_4.0	23/09/2024	S		1		X										
21	MW05_4.5	23/09/2024	S		1		X										
22	MW05_5.0	23/09/2024	S														
23	MW05_7.0	23/09/2024	S		1	X											
TOTAL					12	2	10										

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 →

ADELAIDE U3/1 Burma Road Poonah SA 5095
 Ph. 08 8192 5130 E. adelaide@atsglobal.com
BRISBANE 22 Shand Street Stafford QLD 4053
 Ph. 07 5243 7222 E. samples.brisbane@atsglobal.com
GLADSTONE 46 Callamondah Drive Clinton QLD 4680
 Ph. 07 7471 5600 E. gladstone@atsglobal.com

QMACKEY 78 Harbour Road Mackay QLD 4740
Ph: 07-4944 1177 E: mackey@alsglobal.com

QMELBORNE 2-4 Westall Road Springvale VIC
Ph: 03 8549 0600 E: samples.melbourne@alsglobal.com

QMUDGE 27 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee.mau@alsglobal.com

☐ NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304
☐ RD 908/2007/0433 E. samples.newcastle@alsglobal.com
 Ph: 02 4423 2063 E. norwa@alsglobal.com
☐ PERTH 10 Had Way Malaga WA 6000
 Ph: 08 9200 7055 E. samples.perth@alsglobal.com

OSYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8555 E: sampels_sydney@alsglobal.com
TOWNSVILLE 14-15 Despard Court Boileu QLD 4818
Ph: 07 4766 0800 E: townsville.environmental@alsglobal.com
DWOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkembala@alsglobal.com

CLIENT: GHD		TURNAROUND REQUIREMENTS : ☐ Standard TAT (List due date): 9/10/2024		FOR LABORATORY USE ONLY (Circle)	
OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000		(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:		Free Ice / frozen ice bricks present upon receipt? Yes No N/A	
PROJECT: MFS Port Augusta Further DSI (12647854)		ORDER NO.:		Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: Terrence Wilson		CONTACT PH: 0467 034 756		Other comment:	
SAMPLER: Louise Wright (LW), Sam Marsh (SM)		SAMPLER MOBILE: 0413 631 886		RECEIVED BY:	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RELINQUISHED BY:	
Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com		DATE/TIME:		DATE/TIME:	
Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@ghd.com		30/09/2024, 8.30am		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 Extended Suite - 30 PFAS (Standard LOR)	HOLD							
	24	BH07_0-0.2	23/09/2024	S		1	X								
	25	BH07_0.4-0.5	23/09/2024	S		1		X							
	26	BH07_0.5	23/09/2024	S		1	X								
	27	BH07_1.0	23/09/2024	S		1		X							
	28	BH07_1.5	23/09/2024	S		1	X								
	29	BH07_2.0	23/09/2024	S		1		X							
TOTAL						6	3	3							

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 →

ADLAIDA 131/1 Buma Road Poonaka SA 5095
Ph: 08 8162 5130 E: adelaide@alsglobal.com

BRISBANE 32 Shand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 48 Caffemondah Drive Clinton QLD 4680
Ph: 07 7471 5600 E: gladstone@alsglobal.com

DMACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com

MEIBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGE 27 Sydney Road Mudge NSW 2850
Ph: 02 6372 6735 E: mudge.mails@alsglobal.com

NEWCASTLE 6 Rose Gum Road Warialook NSW 2304
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

PERTH 10 Hod Way Melale WA 6000
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-269 Woodpark Road Smithfield NSW 2164
Ph: 02 8764 8565 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Dasma Court Bohle QLD 4818
Ph: 07 4760 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkemps@alsglobal.com

CLIENT: GHD

OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000

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

☒ Standard TAT (List due date): 9/10/2024
☐ Non Standard or urgent TAT (List due date):

ALS QUOTE: GHD Rates

ORDER NO.:

PROJECT: MFS Port Augusta Further DSI (12647854)

PROJECT MANAGER: Terrence Wilson

SAMPLER: Louise Wright (LW), Sam Marsh (SM)

COC emailed to ALS? (YES / NO)

Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

SAMPLER MOBILE: 0413 631 886

EDD FORMAT (or default):

RELINQUISHED BY: Louise Wright

DATE/TIME: 30/09/2024, 8.30am

RECEIVED BY:

DATE/TIME:

RELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

DATE/TIME:

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:

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 X 5 6 7

OF: 8

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 Extended Suite - 30 PFAS (Standard LOR)	HOLD									Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
30	BH08_0-0.2	23/09/2024	S		1	X										
31	BH08_0.4-0.5	23/09/2024	S		1		X									
32	BH08_0.5	23/09/2024	S		1	X										
33	BH08_1.0	23/09/2024	S		1		X									
34	BH08_1.5	23/09/2024	S		1	X										
35	BH08_2.0	23/09/2024	S		1		X									
36	BH09_0-0.2	23/09/2024	S		1	X										
37	BH09_0.4-0.5	23/09/2024	S		1		X									
38	BH09_0.5	23/09/2024	S		1	X										
39	BH09_1.0	23/09/2024	S		1		X									
40	BH09_1.5	23/09/2024	S		1	X	X									
TOTAL					11	6	6									

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:
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ADLADELAIDE 13/11 Burnside Road Moorak SA 5085
Ph: 08 8162 5130 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street St Albans QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Callamondah Drive Clinton QLD 4680
Ph: 07 7471 9600 E: gladstone@alsglobal.com

MACKAY 78 Hebble Road Mackay QLD 4740
Ph: 07 4844 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8540 0000 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgess NSW 2850
Ph: 02 6372 8735 E: mudgess@alsglobal.com

NEWCASTLE 5 Roper Gum Road Warabrook NSW 2304
Ph: 02 4423 2064 E: newcastle@alsglobal.com
PERTH 10 Hot Way Milinga WA 6090
Ph: 08 9209 7656 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2168
Ph: 02 8784 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-16 Deane Court Bohle QLD 4818
Ph: 07 4766 0800 E: townsville@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date): 9/10/2024 ☐ Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000	ALS QUOTE:	COC SEQUENCE NUMBER (Circle)	Custody Seal Intact?	Yes No N/A
PROJECT: MFS Port Augusta Further DSI (12647854)	ORDER NO.:	COC: 1 2 3 4 X 6 7	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
PROJECT MANAGER: Terrence Wilson	CONTACT PH: 0467 034 756	OF: 8	Random Sample Temperature on Receipt:	°C
SAMPLER: Louise Wright (LW), Sam Marsh (SM)	SAMPLER MOBILE: 0413 631 886	RELINQUISHED BY: Louise Wright	RECEIVED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 30/09/2024, 8.30am	DATE/TIME:	DATE/TIME:
Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com				
Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@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 Extended Suite - 30 PFAS (Standard LOR)	HOLD							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
41	BH09_2.0	23/09/2024	S		1		X								
42	SS08_0-0.1	23/09/2024	S		1	X									
43	SS08_0.2-0.3	23/09/2024	S		1	X									
44	SS09_0-0.1	23/09/2024	S		1	X									
45	SS09-0.2-0.3	23/09/2024	S		1	X									
46	BH10_0-0.2	24/09/2024	S		1	X									
47	BH10_0.4-0.5	24/09/2024	S		1		X								
48	BH10_0.5	24/09/2024	S		1	X									
49	BH10_1.0	24/09/2024	S		1		X								
50	BH10_1.5	24/09/2024	S		1	X									
51	BH10_2.0	24/09/2024	S		1		X								
52	BH11_0-0.2	24/09/2024	S		1	X									
TOTAL					12	8	4								

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:
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ADLAIDE 3311 Glen Road Port Adelaide SA 5005
Ph: 08 8162 8130 E: adelaide@alsglobal.com
BRISBANE 32 Sharn Street Stafford QLD 4053
Ph: 07 3293 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 36 Callernish Drive Clinton QLD 4680
Ph: 07 7471 5606 E: gladstone@alsglobal.com

MACKAY 78 Hartour Road Mackay QLD 4740
Ph: 07 4044 6177 E: mackay@alsglobal.com
MELBOURNE 2-4 Wenzel Road Springvale VIC 3171
Ph: 03 8549 9000 E: samples.melbourne@alsglobal.com
MIDCREE 27 Sydney Road Mulgea NSW 2650
Ph: 02 6372 6735 E: midgela@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warranook NSW 2304
Ph: 08 4308 9044 E: newcastle@alsglobal.com
PERTH 10 Hed Way Malaga WA 6060
Ph: 08 9206 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8764 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-15 Oresma Court Burke QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkimbria@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date): 9/10/2024 ☐ Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000	ALS QUOTE:	COC SEQUENCE NUMBER (Circle)	Custody Seal Intact?	Yes No N/A
PROJECT: MFS Port Augusta Further DSI (12647854)	ORDER NO.:	COC: 1 2 3 4 5 X 7	Free Ice / frozen Ice bricks present upon receipt?	Yes No N/A
PROJECT MANAGER: Terrence Wilson	CONTACT PH: 0467 034 756	OF: 8	Random Sample Temperature on Receipt:	°C
SAMPLER: Louise Wright (LW), Sam Marsh (SM)	SAMPLER MOBILE: 0413 631 886	RELINQUISHED BY:	RECEIVED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	Louise Wright	DATE/TIME:	DATE/TIME:
Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com		DATE/TIME:	DATE/TIME:	DATE/TIME:
Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@ghd.com		30/09/2024, 8.30am		

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 Extended Suite - 30 PFAS (Standard LOR)	HOLD							Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
53	BH11_0.4-0.5	24/09/2024	S		1		X								
54	BH11_0.5	24/09/2024	S		1	X									
55	BH11_1.0	24/09/2024	S		1		X								
56	BH11_1.5	24/09/2024	S		1	X									
57	BH11_2.0	24/09/2024	S		1		X								
58	BH12_0.4-0.5	24/09/2024	S		1	X									
59	BH12_0.5	24/09/2024	S		1		X								
60	BH12_1.0	24/09/2024	S		1	X									
61	BH12_1.5	24/09/2024	S		1		X								
62	BH12_2.0	24/09/2024	S		1		X								
63	MW06_0-0.2	24/09/2024	S		1	X									
64	MW06_0.4-0.5	24/09/2024	S		1		X								
TOTAL					12	5	7								

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 →

ADLADE 1311 Burma Road Prospect SA 5095
Ph: 08 8362 5130 E: adelaide@alsglobal.com

BRISBANE 32 Sharn Street Stelford QLD 4053
Ph: 07 3243 7232 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callender Drive Clinton QLD 4680
Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACRAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com

MELOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 8080 E: samples.melbourne@alsglobal.com

MUDGEE 27 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee.mud@alsglobal.com

NEWCASTLE 5 Rose Gum Road Warracoot NSW 2304
Ph: 08 4066 9033 E: newcastle@alsglobal.com

PERTH 10 Had Way Mataga WA 6000
Ph: 08 9209 7055 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

TOWNSVILLE 14-15 Deema Court Bohle QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

WOLLONGONG 89 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkembela@alsglobal.com

CLIENT: GHD

OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000

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

☐ Standard TAT (List due date): 9/10/2024

☐ 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 Port Augusta Further DSI (12647854)

PROJECT MANAGER: Terrence Wilson

SAMPLER: Louise Wright (LW), Sam Marsh (SM)

COC emailed to ALS? (YES / NO)

Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

CONTACT PH: 0467 034 756

SAMPLER MOBILE: 0413 631 886

RELINQUISHED BY: Louise Wright

DATE/TIME: 30/09/2024, 8.30am

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 X

OF: 8

RECEIVED BY:

DATE/TIME:

RECEIVED BY:

DATE/TIME:

RECEIVED BY:

DATE/TIME:

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 →

ADELAIDE 13/11 Buntia Road Port Adelaide SA 5005
Ph: 08 8162 5130 E: adelaide@alsglobal.com
BRISBANE 32 Strand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 46 Condamine Drive Clinton QLD 4680
Ph: 07 7471 5000 E: gladstone@alsglobal.com

MACKAY 76 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Vynatal Road Springvale VIC 3171
Ph: 03 8549 9000 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgie NSW 2850
Ph: 02 6372 0735 E: mudgie@mail@alsglobal.com

NEWCASTLE 5 Rose Gurn Road Warabrook NSW 2204
Ph: 02 4968 9453 E: samples.newcastle@alsglobal.com
NDWRA 4/13 Garry Place North Ngunia NSW 2541
Ph: 024423 2053 E: ndwra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-280 Woodpark Road Smithfield NSW 2164
Ph: 02 8764 8555 E: samples.sydney@alsglobal.com
TOWNSVILLE 14-16 Desma Court Dehiu QLD 4819
Ph: 07 4790 0000 E: townsville.environmental@alsglobal.com
WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS : * Standard TAT (List due date): 9/10/2024	FOR LABORATORY USE ONLY (Circle)	
OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000	(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 Port Augusta Further DSI (12647854)	ALS QUOTE:	Free ice / frozen ice bricks present upon receipt? Yes No N/A	
PROJECT MANAGER: Terrence Wilson	ORDER NO.:	Random Sample Temperature on Receipt: °C	
CONTACT PH: 0467 034 756		Other comment:	
SAMPLER: Louise Wright (LW), Sam Marsh (SM)	SAMPLER MOBILE: 0413 631 886	RECEIVED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME:	DATE/TIME:
Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com		DATE/TIME:	DATE/TIME:
Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@ghd.com	30/09/2024, 8:30am		

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 Extended Suite - 30 PFAS (Standard LOR) sed and soil	PFAS Short Suite - PFOS	HOLD						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
77	QC03	24/09/2024	S		1	X									
78	QA03	24/09/2024	S		1	X								Please Forward to Eurofins	
79	QC04	24/09/2024	S		1		X								
80	QA04	24/09/2024	S		1		X								
81	QC05	24/09/2024	S		1	X									
82	QA05	24/09/2024	S		1	X								Forward to Eurofins	
83	FB01	23/09/2024	W		1	X									
84	RB01	23/09/2024	W		1	X									
85	FB02	24/09/2024	W		1	X									
86	RB02	24/09/2024	W		1	X									
TOTAL					10	8	2								

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.



CERTIFICATE OF ANALYSIS

Work Order : EM2416721
Client : GHD PTY LTD
Contact : Terrence Wilson
Address : Level 4, 211 VICTORIA SQUARE
ADELAIDE SA, AUSTRALIA 5000
Telephone : ----
Project : MFS Port Augusta Further DSI (12647854)
Order number : ----
C-O-C number : ----
Sampler : LW, SM
Site :
Quote number : EN/000
No. of samples received : 77
No. of samples analysed : 31

Page : 1 of 17
Laboratory : Environmental Division Melbourne
Contact : Peter Ravlic
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +6138549 9645
Date Samples Received : 01-Oct-2024 11:35
Date Analysis Commenced : 04-Oct-2024
Issue Date : 09-Oct-2024 17:23



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	Position	Accreditation Category
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, 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. are fully validated and are often at the client request.

In house developed procedures

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 or as per USEPA 1633 limits where LISTED. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS and also conform to QSM 5.4 (US DoD) requirements.
- 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

				MW04_0-0.2	MW04_3.0	MW05_0-0.2	MW05_7.0	BH08_0-0.2
Sampling date / time				23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	EM2416721-001	EM2416721-007	EM2416721-011	EM2416721-023	EM2416721-030
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	2.4	18.2	1.7	17.2	3.7
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0002	0.0043	<0.0002	<0.0002	0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0002	0.0043	<0.0002	<0.0002	0.0003
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0022	0.0249	<0.0002	<0.0002	0.0048
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.0008	<0.0002	<0.0002	0.0003
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0083	0.0129	0.0020	<0.0002	0.0654
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0059
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	0.0015	<0.0002	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0003	0.0076	<0.0002	<0.0002	0.0004
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.0007	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0012	<0.0002	<0.0002	0.0003
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	0.0004
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	MW04_0-0.2	MW04_3.0	MW05_0-0.2	MW05_7.0	BH08_0-0.2
Sampling date / time					23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416721-001	EM2416721-007	EM2416721-011	EM2416721-023	EM2416721-030
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		0.0112	0.0582	0.0020	<0.0002	0.0782
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0105	0.0378	0.0020	<0.0002	0.0702
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0110	0.0531	0.0020	<0.0002	0.0711
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		97.5	90.8	99.6	92.8	108
13C8-PFOA	----	0.0002	%		94.2	90.0	97.6	109	104



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH08_0.5	BH08_1.5	BH09_0-0.2	BH09_0.5	BH09_1.5
Sampling date / time				23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	EM2416721-032	EM2416721-034	EM2416721-036	EM2416721-038	EM2416721-040
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	3.8	14.6	24.8	3.5	3.6
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.0004	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0002	0.0004	<0.0002	0.0004	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0076	0.0010	0.0013	0.0059	0.0024
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0007	<0.0002	<0.0002	<0.0002	0.0033
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.121	0.0070	0.0132	0.0132	0.203
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0004	<0.0002	0.0020	0.0004	<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	0.0003	<0.0002	0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0002	0.0004	0.0004	0.0007	0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0005	<0.0002	0.0003	0.0002	0.0011
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0007
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.0003	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH08_0.5	BH08_1.5	BH09_0-0.2	BH09_0.5	BH09_1.5
Sampling date / time					23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416721-032	EM2416721-034	EM2416721-036	EM2416721-038	EM2416721-040
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		0.131	0.0095	0.0175	0.0213	0.211
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.129	0.0080	0.0145	0.0191	0.205
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.129	0.0091	0.0152	0.0205	0.207
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		99.2	106	116	110	119
13C8-PFOA	----	0.0002	%		104	106	105	107	92.8



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				SS08_0-0.1	SS08_0.2-0.3	SS09_0-0.1	SS09_0.2-0.3	BH10_0-0.2
Sampling date / time				23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	24-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	EM2416721-042	EM2416721-043	EM2416721-044	EM2416721-045	EM2416721-046
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	3.1	4.0	0.9	1.8	7.4
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0009	0.0007	<0.0002	<0.0002	0.0023
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0015	0.0012	<0.0002	<0.0002	0.0012
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0156	0.0176	<0.0002	0.0003	0.0036
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0005	0.0007	<0.0002	<0.0002	0.0003
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0766	0.0646	0.0030	0.0010	0.0607
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0104	0.0049	<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	0.002
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0004	0.0004	<0.0002	<0.0002	0.0024
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0016	0.0007	<0.0002	<0.0002	0.0065
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0003	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0009	0.0013	<0.0002	<0.0002	0.0004
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	0.0004	0.0002	<0.0002	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0007	0.0005	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0011	0.0006	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	SS08_0-0.1	SS08_0.2-0.3	SS09_0-0.1	SS09_0.2-0.3	BH10_0-0.2
Sampling date / time					23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	23-Sep-2024 00:00	24-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416721-042	EM2416721-043	EM2416721-044	EM2416721-045	EM2416721-046
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		0.0009	0.0040	<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		0.112	0.0976	0.0030	0.0013	0.0794
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0922	0.0822	0.0030	0.0013	0.0643
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0963	0.0853	0.0030	0.0013	0.0779
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		114	97.2	120	98.4	106
13C8-PFOA	----	0.0002	%		103	84.5	94.5	101	102



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH10_0.5	BH10_1.5	BH11_0-0.2	BH11_0.5	BH11_1.5
Sampling date / time				24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	EM2416721-048	EM2416721-050	EM2416721-052	EM2416721-054	EM2416721-056
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	6.5	10.4	6.7	10.6	10.9
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0014	0.0017	0.0165	0.0144	0.0026
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0013	0.0012	0.0096	0.0236	0.0068
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0154	0.0057	0.0178	0.283	0.0625
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0006	<0.0002	0.0003	0.0118	0.0033
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0034	0.0008	0.0088	0.0079	0.0520
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	0.002	<0.001	0.004	0.002	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0016	0.0008	0.0092	0.0062	0.0009
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0044	0.0041	0.0497	0.0605	0.0122
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0004	<0.0002	0.0012	0.0057	0.0013
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0011	0.0002	0.0005	0.0214	0.0034
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 (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH10_0.5	BH10_1.5	BH11_0-0.2	BH11_0.5	BH11_1.5
Sampling date / time					24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416721-048	EM2416721-050	EM2416721-052	EM2416721-054	EM2416721-056
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		0.0316	0.0145	0.118	0.436	0.145
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0188	0.0065	0.0266	0.291	0.114
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0297	0.0133	0.108	0.401	0.135
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		119	98.2	108	118	108
13C8-PFOA	----	0.0002	%		104	104	102	88.0	104



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				BH12_0.4-0.5	BH12_1.0	MW06_0-0.2	MW06_3.0	QC01
Sampling date / time				24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	23-Sep-2024 00:00
Compound	CAS Number	LOR	Unit	EM2416721-058	EM2416721-060	EM2416721-063	EM2416721-070	EM2416721-073
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	7.6	9.7	5.5	19.6	17.7
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0004	0.0005	<0.0002	<0.0002	0.0039
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0008	0.0007	<0.0002	<0.0002	0.0041
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0137	0.0028	0.0011	<0.0002	0.0236
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0008	<0.0002	<0.0002	<0.0002	0.0007
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0116	0.0007	0.0011	<0.0002	0.0130
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	0.0006	0.0005	<0.0002	<0.0002	0.0017
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0011	0.0017	<0.0002	<0.0002	0.0075
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0005	0.0002	<0.0002	<0.0002	0.0007
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0014	<0.0002	0.0008	<0.0002	0.0011
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 (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH12_0.4-0.5	BH12_1.0	MW06_0-0.2	MW06_3.0	QC01
Sampling date / time					24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	23-Sep-2024 00:00
Compound	CAS Number	LOR	Unit		EM2416721-058	EM2416721-060	EM2416721-063	EM2416721-070	EM2416721-073
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		0.0309	0.0071	0.0030	<0.0002	0.0563
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0253	0.0035	0.0022	<0.0002	0.0366
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0293	0.0064	0.0030	<0.0002	0.0515
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		114	110	98.4	108	126
13C8-PFOA	----	0.0002	%		103	92.2	104	93.2	101



Analytical Results

Sub-Matrix: SOIL
 (Matrix: SOIL)

Sample ID

				QC02	QC03	----	----	----
Sampling date / time				23-Sep-2024 00:00	24-Sep-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2416721-075	EM2416721-077	-----	-----	-----
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	7.6	8.2	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0010	0.0019	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0005	0.0025	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0036	0.0157	----	----	----
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	0.0268	0.0009	----	----	----
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	0.0008	0.0015	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0009	0.0077	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.0006	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0007	----	----	----
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 (PFTrDA)	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	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QC02	QC03	----	----	----
Sampling date / time					23-Sep-2024 00:00	24-Sep-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2416721-075	EM2416721-077	-----	-----	-----
					Result	Result	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	----	----	----
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		0.0346	0.0325	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0304	0.0166	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0341	0.0300	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		102	110	----	----	----
13C8-PFOA	----	0.0002	%		97.2	109	----	----	----

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FB01	RB01	FB02	RB02	----
Sampling date / time				23-Sep-2024 00:00	23-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	----	
Compound	CAS Number	LOR	Unit	EM2416721-083	EM2416721-084	EM2416721-085	EM2416721-086	-----	
				Result	Result	Result	Result	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----	
Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.10	µg/L	<0.10	<0.10	<0.10	<0.10	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<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	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<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	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<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	----	
EP231C: Perfluoroalkyl Sulfonamides									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	FB01	RB01	FB02	RB02	----
Sampling date / time					23-Sep-2024 00:00	23-Sep-2024 00:00	24-Sep-2024 00:00	24-Sep-2024 00:00	----
Compound	CAS Number	LOR	Unit		EM2416721-083	EM2416721-084	EM2416721-085	EM2416721-086	-----
					Result	Result	Result	Result	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L		<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	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L		<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	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L		<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	----
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	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L		<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	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L		<0.05	<0.05	<0.05	<0.05	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	----
Sum of PFAS (WA DER List)	----	0.01	µg/L		<0.01	<0.01	<0.01	<0.01	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%		95.4	94.8	95.8	100	----
13C8-PFOA	----	0.02	%		102	102	102	101	----



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	: EM2416721	Page	: 1 of 15
Client	: GHD PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: Terrence Wilson	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 Port Augusta Further DSI (12647854)	Date Samples Received	: 01-Oct-2024
Order number	: ----	Date Analysis Commenced	: 04-Oct-2024
C-O-C number	: ----	Issue Date	: 09-Oct-2024
Sampler	: LW, SM		
Site	:		
Quote number	: EN/000		
No. of samples received	: 77		
No. of samples analysed	: 31		



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
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, 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: 6101155)									
EM2416721-001	MW04_0-0.2	EA055: Moisture Content	----	0.1	%	2.4	2.8	14.1	0% - 20%
EM2416721-042	SS08_0-0.1	EA055: Moisture Content	----	0.1	%	3.1	3.4	9.1	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 6101156)									
EM2416721-058	BH12_0.4-0.5	EA055: Moisture Content	----	0.1	%	7.6	8.8	15.1	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6103691)									
EM2416721-001	MW04_0-0.2	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	0.0022	0.0016	35.6	0% - 50%
		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	0.0083	0.0069	17.5	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0	No Limit
EM2416721-042	SS08_0-0.1	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0009	0.0008	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0015	0.0016	11.2	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0156	0.0165	5.3	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0005	0.0006	21.3	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0766	0.0743	3.1	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0104	0.0103	1.3	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6103692)									
EM2416721-058	BH12_0.4-0.5	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0004	0.0003	0.0	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	0.0008	0.0005	40.0	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0137	0.0117	15.9	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0008	0.0007	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: 6103692) - continued									
EM2416721-058	BH12_0.4-0.5	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0116	0.0109	6.4	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: 6103691)									
EM2416721-001	MW04_0-0.2	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	0.0003	0.0003	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
EM2416721-042	SS08_0-0.1	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0004	0.0004	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0016	0.0016	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0003	0.0003	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0009	0.0010	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	0.0004	0.0005	0.0	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0007	0.0006	18.2	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0011	0.0010	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: 6103692)									
EM2416721-058	BH12_0.4-0.5	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	0.0006	0.0005	0.0	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0011	0.0010	0.0	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0005	0.0005	0.0	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0014	0.0016	13.1	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

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: 6103691)									
EM2416721-001	MW04_0-0.2	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
EM2416721-042	SS08_0-0.1	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	0.0009	0.0008	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: 6103692)									
EM2416721-058	BH12_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
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 6103691)									



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: 6103691) - continued									
EM2416721-001	MW04_0-0.2	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
EM2416721-042	SS08_0-0.1	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: 6103692)									
EM2416721-058	BH12_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
EP231P: PFAS Sums (QC Lot: 6103691)									
EM2416721-001	MW04_0-0.2	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0112	# 0.0088	24.0	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0105	# 0.0085	21.1	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0110	# 0.0088	22.2	0% - 20%
EM2416721-042	SS08_0-0.1	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.112	0.110	1.3	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0922	0.0908	1.5	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0963	0.0949	1.5	0% - 20%
EP231P: PFAS Sums (QC Lot: 6103692)									
EM2416721-058	BH12_0.4-0.5	EP231X: Sum of PFAS	----	0.0002	mg/kg	0.0309	0.0277	10.9	0% - 20%
		EP231X: Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0253	0.0226	11.3	0% - 20%
		EP231X: Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0293	0.0265	10.0	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: 6105322)									
EM2416721-083	FB01	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: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L	<0.02	<0.02	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: Perfluorononane sulfonic acid (PFNS)	68259-12-1	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: 6105322)									
EM2416721-083	FB01	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: 6105322)									
EM2416721-083	FB01	EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.0	No Limit
		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

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 Work Order : EM2416721
 Client : GHD PTY LTD
 Project : MFS Port Augusta Further DSI (12647854)



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: 6105322) - continued									
EM2416721-083	FB01	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: 6105322)									
EM2416721-083	FB01	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: 6105322)									
EM2416721-083	FB01	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: 6103691)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	92.5	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	98.8	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	87.7	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	89.3	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	82.5	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	78.8	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6103692)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00111 mg/kg	89.2	72.0	128
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00118 mg/kg	100	73.0	123
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00114 mg/kg	91.0	67.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00119 mg/kg	102	70.0	132
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00116 mg/kg	88.7	68.0	136
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00121 mg/kg	89.2	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6103691)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	96.1	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.3	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.2	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.5	71.0	131
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.6	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	98.6	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.2	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.0	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.3	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.2	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	90.0	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6103692)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	87.9	71.0	135
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.3	69.0	132
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.2	70.0	132
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.6	71.0	131



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
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6103692) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.8	69.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.8	72.0	129
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.9	69.0	133
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	95.1	64.0	136
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.9	69.0	135
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.2	66.0	139
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	104	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6103691)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.4	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.7	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	102	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	90.3	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.7	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.2	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6103692)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.0	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	93.8	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	86.9	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.5	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.5	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	93.3	63.0	144
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6103691)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	90.0	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	101	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	102	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	94.1	70.0	130



Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6103692)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00117 mg/kg	89.4	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	89.7	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	88.5	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	85.7	70.0	130
EP231P: PFAS Sums (QCLot: 6103691)								
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: 6103692)								
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: 6105322)								
EP231X-INJ: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.02	µg/L	<0.02	0.5 µg/L	106	70.0	130
EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.444 µg/L	113	72.0	130
EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.471 µg/L	115	71.0	127
EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.457 µg/L	104	68.0	131
EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.477 µg/L	116	69.0	134
EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.465 µg/L	98.0	65.0	140
EP231X-INJ: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.02	µg/L	<0.02	0.5 µg/L	102	69.0	127
EP231X-INJ: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.482 µg/L	104	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6105322)								
EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.10	2.5 µg/L	102	73.0	129
EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	92.0	72.0	129
EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	102	72.0	129
EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	105	72.0	130
EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	106	71.0	133
EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	113	69.0	130
EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	113	71.0	129
EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	96.5	69.0	133



Sub-Matrix: **WATER**

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				
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6105322) - continued								
EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	112	72.0	134
EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	114	65.0	144
EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	106	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6105322)								
EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	105	67.0	137
EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	106	68.0	141
EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	113	70.0	130
EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	99.9	70.0	130
EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	101	70.0	130
EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	118	65.0	136
EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	117	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6105322)								
EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.469 µg/L	106	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	96.5	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	114	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	112	70.0	130
EP231P: PFAS Sums (QCLot: 6105322)								
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			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6103691)							
EM2416721-007	MW04_3.0	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	# Not Determined	72.0	128



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: 6103691) - continued							
EM2416721-007	MW04_3.0	EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	88.5	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	# Not Determined	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	75.7	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	89.9	59.0	134
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6103692)							
EM2416721-060	BH12_1.0	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00111 mg/kg	106	72.0	128
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00118 mg/kg	115	73.0	123
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00114 mg/kg	94.8	67.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00119 mg/kg	104	70.0	132
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00116 mg/kg	74.8	68.0	136
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00121 mg/kg	83.9	59.0	134
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6103691)							
EM2416721-007	MW04_3.0	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	99.5	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	90.0	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	# Not Determined	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	91.9	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	106	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	108	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	109	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	94.3	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	102	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.00125 mg/kg	123	66.0	139
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	107	69.0	133
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6103692)							
EM2416721-060	BH12_1.0	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	85.2	71.0	135
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	87.9	69.0	132
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	94.4	70.0	132
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	85.0	71.0	131
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	94.2	69.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	98.3	72.0	129
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	92.9	69.0	133
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	89.3	64.0	136
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	93.8	69.0	135
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.00125 mg/kg	88.2	66.0	139



Sub-Matrix: SOIL				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6103692) - continued							
EM2416721-060	BH12_1.0	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	108	69.0	133
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6103691)							
EM2416721-007	MW04_3.0	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	89.9	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	97.3	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	105	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	87.3	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	105	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	102	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	89.0	61.0	139
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6103692)							
EM2416721-060	BH12_1.0	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	88.2	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	90.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	81.5	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.00312 mg/kg	95.6	70.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	96.5	70.0	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	106	63.0	144
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	93.4	61.0	139
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6103691)							
EM2416721-007	MW04_3.0	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	106	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00119 mg/kg	77.7	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	119	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00121 mg/kg	71.7	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6103692)							
EM2416721-060	BH12_1.0	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00117 mg/kg	86.1	62.0	145
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00119 mg/kg	84.2	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0012 mg/kg	99.0	65.0	137
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00121 mg/kg	70.9	70.0	130
Sub-Matrix: WATER				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: 6105322)							
EM2416721-084	RB01	EP231X-INJ: Perfluoropropane sulfonic acid (PFPrS)	423-41-6	0.5 µg/L	105	70.0	130
		EP231X-INJ: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.444 µg/L	109	72.0	130
		EP231X-INJ: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.471 µg/L	117	71.0	127
		EP231X-INJ: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.457 µg/L	106	68.0	131
		EP231X-INJ: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.477 µg/L	114	69.0	134
		EP231X-INJ: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.465 µg/L	89.7	65.0	140
		EP231X-INJ: Perfluorononane sulfonic acid (PFNS)	68259-12-1	0.5 µg/L	94.4	69.0	127
		EP231X-INJ: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.482 µg/L	100	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6105322)							
EM2416721-084	RB01	EP231X-INJ: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	103	73.0	129
		EP231X-INJ: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	93.9	72.0	129
		EP231X-INJ: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	104	72.0	129
		EP231X-INJ: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	106	72.0	130
		EP231X-INJ: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	105	71.0	133
		EP231X-INJ: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	115	69.0	130
		EP231X-INJ: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	119	71.0	129
		EP231X-INJ: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	117	69.0	133
		EP231X-INJ: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	112	72.0	134
		EP231X-INJ: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	121	65.0	144
		EP231X-INJ: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	115	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6105322)							
EM2416721-084	RB01	EP231X-INJ: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	107	67.0	137
		EP231X-INJ: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	106	68.0	141
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	106	70.0	130
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	97.1	70.0	130
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	105	70.0	130
		EP231X-INJ: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	132	65.0	136
		EP231X-INJ: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	109	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6105322)							
EM2416721-084	RB01	EP231X-INJ: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.469 µg/L	118	63.0	143
		EP231X-INJ: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.476 µg/L	110	64.0	140
		EP231X-INJ: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.48 µg/L	113	67.0	138
		EP231X-INJ: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.483 µg/L	103	70.0	130





QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EM2416721**

Page : 1 of 8

Client : **GHD PTY LTD**
Contact : Terrence Wilson
Project : MFS Port Augusta Further DSI (12647854)
Site :
Sampler : LW, SM
Order number : ----

Laboratory : Environmental Division Melbourne
Telephone : +6138549 9645
Date Samples Received : 01-Oct-2024
Issue Date : 09-Oct-2024
No. of samples received : 77
No. of samples analysed : 31

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: SOIL

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP231P: PFAS Sums	EM2416721--001	MW04_0-0.2	Sum of PFAS	----	24.0 %	0% - 20%	RPD exceeds LOR based limits
EP231P: PFAS Sums	EM2416721--001	MW04_0-0.2	Sum of PFHxS and PFOS	355-46-4/1763-23-1	21.1 %	0% - 20%	RPD exceeds LOR based limits
EP231P: PFAS Sums	EM2416721--001	MW04_0-0.2	Sum of PFAS (WA DER List)	----	22.2 %	0% - 20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EM2416721--007	MW04_3.0	Perfluorobutane sulfonic acid (PFBS)	375-73-5	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EM2416721--007	MW04_3.0	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EM2416721--007	MW04_3.0	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231B: Perfluoroalkyl Carboxylic Acids	EM2416721--007	MW04_3.0	Perfluorohexanoic acid (PFHxA)	307-24-4	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

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) MW04_0-0.2, MW05_0-0.2, BH08_0-0.2, BH08_1.5, BH09_0.5, SS08_0-0.1, SS09_0-0.1, QC01, MW04_3.0, MW05_7.0, BH08_0.5, BH09_0-0.2, BH09_1.5, SS08_0.2-0.3, SS09_0.2-0.3, QC02	23-Sep-2024	----	----	----	04-Oct-2024	07-Oct-2024	✓	
HDPE Soil Jar (EA055) BH10_0-0.2, BH10_1.5, BH11_0.5, BH12_0.4-0.5, MW06_0-0.2, QC03 BH10_0.5, BH11_0-0.2, BH11_1.5, BH12_1.0, MW06_3.0	24-Sep-2024	----	----	----	04-Oct-2024	08-Oct-2024	✓	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE Soil Jar (EP231X) MW04_0-0.2, MW05_0-0.2, BH08_0-0.2, BH08_1.5, BH09_0.5, SS08_0-0.1, SS09_0-0.1, QC01, MW04_3.0, MW05_7.0, BH08_0.5, BH09_0-0.2, BH09_1.5, SS08_0.2-0.3, SS09_0.2-0.3, QC02	23-Sep-2024	08-Oct-2024	22-Mar-2025	✓	08-Oct-2024	17-Nov-2024	✓	
HDPE Soil Jar (EP231X) BH10_0-0.2, BH10_1.5, BH11_0.5, BH12_0.4-0.5, MW06_0-0.2, QC03 BH10_0.5, BH11_0-0.2, BH11_1.5, BH12_1.0, MW06_3.0	24-Sep-2024	08-Oct-2024	23-Mar-2025	✓	08-Oct-2024	17-Nov-2024	✓	

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) MW04_0-0.2, MW05_0-0.2, BH08_0-0.2, BH08_1.5, BH09_0.5, SS08_0-0.1, SS09_0-0.1, QC01, MW04_3.0, MW05_7.0, BH08_0.5, BH09_0-0.2, BH09_1.5, SS08_0.2-0.3, SS09_0.2-0.3, QC02	23-Sep-2024	08-Oct-2024	22-Mar-2025	✓	08-Oct-2024	17-Nov-2024	✓
HDPE Soil Jar (EP231X) BH10_0-0.2, BH10_1.5, BH11_0.5, BH12_0.4-0.5, MW06_0-0.2, QC03, BH10_0.5, BH11_0-0.2, BH11_1.5, BH12_1.0, MW06_3.0	24-Sep-2024	08-Oct-2024	23-Mar-2025	✓	08-Oct-2024	17-Nov-2024	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE Soil Jar (EP231X) MW04_0-0.2, MW05_0-0.2, BH08_0-0.2, BH08_1.5, BH09_0.5, SS08_0-0.1, SS09_0-0.1, QC01, MW04_3.0, MW05_7.0, BH08_0.5, BH09_0-0.2, BH09_1.5, SS08_0.2-0.3, SS09_0.2-0.3, QC02	23-Sep-2024	08-Oct-2024	22-Mar-2025	✓	08-Oct-2024	17-Nov-2024	✓
HDPE Soil Jar (EP231X) BH10_0-0.2, BH10_1.5, BH11_0.5, BH12_0.4-0.5, MW06_0-0.2, QC03, BH10_0.5, BH11_0-0.2, BH11_1.5, BH12_1.0, MW06_3.0	24-Sep-2024	08-Oct-2024	23-Mar-2025	✓	08-Oct-2024	17-Nov-2024	✓

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

Matrix: WATER

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) FB01,	RB01	23-Sep-2024	08-Oct-2024	22-Mar-2025	✓	08-Oct-2024	22-Mar-2025	✓
HDPE (no PTFE) (EP231X-INJ) FB02,	RB02	24-Sep-2024	08-Oct-2024	23-Mar-2025	✓	08-Oct-2024	23-Mar-2025	✓



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	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X-INJ) FB01,	RB01	23-Sep-2024	08-Oct-2024	22-Mar-2025	✔	08-Oct-2024	22-Mar-2025	✔
HDPE (no PTFE) (EP231X-INJ) FB02,	RB02	24-Sep-2024	08-Oct-2024	23-Mar-2025	✔	08-Oct-2024	23-Mar-2025	✔
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-INJ) FB01,	RB01	23-Sep-2024	08-Oct-2024	22-Mar-2025	✔	08-Oct-2024	22-Mar-2025	✔
HDPE (no PTFE) (EP231X-INJ) FB02,	RB02	24-Sep-2024	08-Oct-2024	23-Mar-2025	✔	08-Oct-2024	23-Mar-2025	✔
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-INJ) FB01,	RB01	23-Sep-2024	08-Oct-2024	22-Mar-2025	✔	08-Oct-2024	22-Mar-2025	✔
HDPE (no PTFE) (EP231X-INJ) FB02,	RB02	24-Sep-2024	08-Oct-2024	23-Mar-2025	✔	08-Oct-2024	23-Mar-2025	✔
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-INJ) FB01,	RB01	23-Sep-2024	08-Oct-2024	22-Mar-2025	✔	08-Oct-2024	22-Mar-2025	✔
HDPE (no PTFE) (EP231X-INJ) FB02,	RB02	24-Sep-2024	08-Oct-2024	23-Mar-2025	✔	08-Oct-2024	23-Mar-2025	✔



Quality Control Parameter Frequency Compliance

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

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	3	27	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	27	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	27	7.41	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	4	25.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-INJ	1	4	25.00	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 5.4, 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.

Samples received without CoC

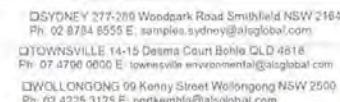
Environmental Division
Melbourne
Work Order Reference
EM2417600



Telephone : +61-3-8549 9600

CLIENT / SENDER: GHD	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Comments FREIGHT
PROJECT: 12647854		
CONTACT NAME:		
CONTACT NUMBER:	SAMPLES RECEIVED BY:	
CARRIER:	DATE/TIME: 22-5	
CONNOTE REFERENCE:	ANALYSIS RECEIVED BY: Monica	
SAMPLER: JA/cw	DATE/TIME: 17/10 12:00	
NUMBER OF SAMPLES/MATRIX:		
Client services notified by:		

LAB ID	SAMPLE DETAILS				Additional Information
	SAMPLE ID	DATE	MATRIX	NUMBER OF CONTAINERS	
	Swor	21/10			CO to be ANALYSED
	mwoc				
	etc				
TOTAL					



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

		CHAIN OF CUSTODY ALS Laboratory: please tick →		ADELAIDE U3/1 Burma Road Peoria SA 5095 Ph: 08 8162 5130 E: adelaide@alsglobal.com BRISBANE 33 Shand Street Stairford QLD 4053 Ph: 07 3243 7232 E: samples.brisbane@alsglobal.com GLADSTONE 46 Callenderah Drive Clinton QLD 4660 Ph: 07 7471 5600 E: gladstone@alsglobal.com		MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8548 9800 E: samples.melbourne@alsglobal.com MUDGEE 27 Sydney Road Mudgee NSW 2650 Ph: 02 6372 6735 E: mudgee@mail@alsglobal.com		NEWCASTLE 5 Rose Gum Road Warbrook NSW 2304 Ph: 02 4068 0433 E: samples.newcastle@alsglobal.com NOOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2062 E: nowra@alsglobal.com PERTH 10 Hod Way Malaga WA 6009 Ph: 08 9208 7655 E: samples.perth@alsglobal.com		SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com TOWNSVILLE 14-15 Dasma Court Bohle QLD 4818 Ph: 07 4706 0600 E: townsville.environmental@alsglobal.com WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: perikembla@alsglobal.com				
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: 12647854				ALS QUOTE:				Free ice / frozen ice bricks present upon receipt? Yes No N/A						
PROJECT MANAGER: Terrence Wilson				ORDER NO.:				Random Sample Temperature on Receipt: °C						
CONTACT PH: 0467 034 756				COC SEQUENCE NUMBER (Circle)				Other comment:						
SAMPLER: Joshua Anderson (JA), Louise Wright (LW)				COC: 1 2 3 4 5 6 7										
SAMPLER MOBILE: +61 8 8111 6710				OF: 1 2 3 4 5 6 7										
COC emailed to ALS? YES				RECEIVED BY: Kieren Burns										
Email Reports to: GHDLabReports@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Joshua.Anderson2@ghd.com				RELINQUISHED BY: Louise Wright										
Email Invoice to: accountspayableAU@ghd.com				DATE/TIME: 10/10/2024, 4pm										
				DATE/TIME:										
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:														
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 (fold filtered bottle required).														
Additional Information														
Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.														
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	PFAS - Extended Suite (Super Ultra Trace)	PFAS TOPA (Low Level)	Nitrate, Nitrite, Ammonia	8 Metals (Total)	8 Metals (Dissolved)	Major Cations + Anions	PFAS Short Suite (Super Ultra Trace PFOS)	HOLD	
11	FD01	9/10/2024	W	P	2	X								
→	FS01	9/10/2024	W	P	2	X								
NP	RB01	9/10/2024	W	P	2							X		
14/10	FB01	9/10/2024	W	P	2							X		
Extra sample : BN 14/10														
12)	SW01	8/10/2024	W	1x green, 1x Purple, 1x Filt red + 1x Total red	4									
TOTAL														
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.														

Richard Baez

From:
Sent:
To:
Cc:
Subject:
Attachments:

Joshua Anderson <Joshua.Anderson2@ghd.com>
Monday, 14 October 2024 11:21 AM
Kieren Burns
Peter Ravlic; Terrence Wilson
[EXTERNAL] - 12647853/4 COC's
12647854_MFS Port Augusta Supp DSL_GW_COC.xlsx; 12647853_MFS Peterborough
Supp DSL_GW_COC.xlsx

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 attached the COC's for samples delivered Thursday last week,

Any questions please reach out,

Cheers,

Joshua Anderson
Undergraduate Environmental Scientist
Environment and Planning Team

GHD

Proudly employee-owned | ghd.com

Level 4, 211 Victoria sq, Adelaide, 5000, Australia

D +61 8 8111 6710 E Joshua.Anderson2@ghd.com



GHD acknowledges the Traditional Owners of Country throughout Australia.
We pay respect to their continuing culture and Elders past, present and emerging.
[Click here to learn about our Reconciliation Action Plan.](#)



I acknowledge the Traditional Custodians of the lands on which I work, the Kaurna people of the Adelaide Plains (when working in the office), and pay my respects to their Elders past, present and emerging. Extending this same respect to all Aboriginal and Torres Strait Islander People

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Samples received without CoC

Environmental Division
Melbourne

Work Order Reference
EM2417600



Telephone : +61-3-8549 9600

CLIENT / SENDER: GHD	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Comments FREIGHT
PROJECT: 12647854		
CONTACT NAME:		
CONTACT NUMBER:	SAMPLES RECEIVED BY:	
CARRIER:	DATE/TIME: 22-5	
CONNOTE REFERENCE:	ANALYSIS RECEIVED BY: Monica (ms)	
SAMPLER: JA/cw	DATE/TIME: 17/10 12:00	
NUMBER OF SAMPLES/MATRIX:		
Client services notified by:		

LAB ID	SAMPLE DETAILS				Additional Information	
	SAMPLE ID	DATE	MATRIX	NUMBER OF CONTAINERS	SCANNED	
	SW01	9/10			CO to be MAILED	
	mw04					
	etc					
TOTAL						

		CHAIN OF CUSTODY ALS Laboratory: please tick →		ADELAIDE U3/1 Burma Road Pootara SA 5005 Ph: 08 8162 5130 E: adelaide@alsglobal.com		MACKAY 76 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com		NEWCASTLE 5 Rose Gum Road Warahook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsglobal.com		SYDNEY 217-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com				
BRISBANE 33 Strand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com		MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9800 E: samples.melbourne@alsglobal.com		NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com		TOWNSVILLE 14-15 Desma Court Beahle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com		WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com						
GLADSTONE 46 Callamondah Drive Clinton QLD 4080 Ph: 07 7471 5000 E: gladstone@alsglobal.com		MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 8735 E: mudgee@mail@alsglobal.com		PERTH 10 Hod Way Melaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com										
CLIENT: GHD		OFFICE: Adelaide		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:						
PROJECT: 12647854		ORDER NO.:		COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7										
PROJECT MANAGER: Terrence Wilson		CONTACT PH: 0467 034 756		SAMPLER: Joshua Anderson (JA), Louise Wright (LW)				SAMPLER MOBILE: +61 8 8111 6710						
COC emailed to ALS? YES		EDD FORMAT (or default): Esdat		RELINQUISHED BY: Louise Wright				RECEIVED BY: Kieren Burns						
Email Reports to: GHDLabReports@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Joshua.Anderson2@ghd.com		Email Invoice to: accountspayableAU@ghd.com		DATE/TIME: 10/10/2024, 4pm				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 - Extended Suite (Super Ultra Trace)	PFAS TOPA (Low Level)	Nitrate, Nitrite, Ammonia	8 Metals (Total)	8 Metals (Dissolved)	Major Cations + Anions	PFAS Short Suite (Super Ultra Trace PFOS)	HOLD	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	MW01	8/10/2024	W	P	2	X	X							
2	MW02	8/10/2024	W	P	2	X								
3	MW03	8/10/2024	W	P	2	X								
4	MW04	9/10/2024	W	P/N/S	2	X	X	X	X	X	X			
5	MW05	9/10/2024	W	P	2	X								
6	MW06	9/10/2024	W	P	2	X								
7	SW_HYDRANT	9/10/2024	W	P	2	X								
8	SW01	9/10/2024	W	P/N/S	6	X		X	X	X	X			
9	SW02	9/10/2024	W	P/N/S	6	X		X	X	X	X			
10	SW03	9/10/2024	W	P/N/S	6	X		X	X	X	X			
TOTAL														
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.														

		CHAIN OF CUSTODY ALS Laboratory: please tick →		ADELAIDE 13/1 Burns Road Port Adelaide SA 5095 Ph: 08 8162 5130 E: adelaide@alsglobal.com BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com		MACKAY 75 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 6600 E: samples.melbourne@alsglobal.com MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 8735 E: mudgee@mail@alsglobal.com		NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304 Ph: 02 4908 0433 E: samples.newcastle@alsglobal.com NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com PERTH 10 Had Way Malaga WA 6090 Ph: 08 9200 7655 E: samples.perth@alsglobal.com		SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com TOWNSVILLE 14-15 Drama Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com				
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):				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: 12647854				ALS QUOTE:		COC SEQUENCE NUMBER (Circle)								
PROJECT MANAGER: Terrence Wilson				ORDER NO.:		COC: 1 2 3 4 5 6 7								
CONTACT PH: 0467 034 756						OF: 1 2 3 4 5 6 7								
SAMPLER: Joshua Anderson (JA), Louise Wright (LW)				SAMPLER MOBILE: +61 8 8111 6710		RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:				
COC emailed to ALS? YES				EDD FORMAT (or default): Esdat		Louise Wright		Kieren Burns						
Email Reports to: GHDLabReports@ghd.com; Terrence.Wilson@ghd.com; Ben.Petticrew@ghd.com; Joshua.Anderson2@ghd.com						DATE/TIME: 10/10/2024, 4pm		DATE/TIME:		DATE/TIME:				
Email Invoice to: 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 - Extended Suite (Super Ultra Trace)	PFAS TOPA (Low Level)	Nitrate, Nitrite, Ammonia	8 Metals (Total)	8 Metals (Dissolved)	Major Cations + Anions	PFAS Short Suite (Super Ultra Trace PFOS)	HOLD	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
11	FD01	9/10/2024	W	P	2	X								
→	FS01	9/10/2024	W	P	2	X								Forward to Eurofins
NR	RB01	9/10/2024	W	P	2							X		
14/10	FB01	9/10/2024	W	P	2							X		
12	sw01	8/10/2024	W	1x green, 1x Purple, 1x Filt red + 1x Total red	4									
TOTAL														
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.														

Richard Baez

From: Joshua Anderson <Joshua.Anderson2@ghd.com>
Sent: Monday, 14 October 2024 11:21 AM
To: Kieren Burns
Cc: Peter Ravlic; Terrence Wilson
Subject: [EXTERNAL] - 12647853/4 COC's
Attachments: 12647854_MFS Port Augusta Supp DSL_GW_COC.xlsx; 12647853_MFS Peterborough Supp DSL_GW_COC.xlsx

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 attached the COC's for samples delivered Thursday last week,

Any questions please reach out,

Cheers,

Joshua Anderson
Undergraduate Environmental Scientist
Environment and Planning Team

GHD

Proudly employee-owned | ghd.com

Level 4, 211 Victoria sq, Adelaide, 5000, Australia

D +61 8 8111 6710 E Joshua.Anderson2@ghd.com



GHD acknowledges the Traditional Owners of Country throughout Australia.
We pay respect to their continuing culture and Elders past, present and emerging.
[Click here to learn about our Reconciliation Action Plan.](#)



I acknowledge the Traditional Custodians of the lands on which I work, the Kaurna people of the Adelaide Plains (when working in the office), and pay my respects to their Elders past, present and emerging. Extending this same respect to all Aboriginal and Torres Strait Islander People

CONFIDENTIALITY NOTICE: This email, including any attachments, is confidential and may be privileged. If you are not the intended recipient please notify the sender immediately, and please delete it; you should not copy it or use it for any purpose or disclose its contents to any other person. GHD and its affiliates reserve the right to monitor and modify all email communications through their networks.



CERTIFICATE OF ANALYSIS

Work Order : EM2417600
Client : GHD PTY LTD
Contact : Terrence Wilson
Address : Level 4, 211 VICTORIA SQUARE
ADELAIDE SA, AUSTRALIA 5000
Telephone : ----
Project : 12647854
Order number : 12647854
C-O-C number : ----
Sampler : Joshua Anderson (JA), Louise Wright (LW)
Site :
Quote number : EN/000
No. of samples received : 13
No. of samples analysed : 13

Page : 1 of 15
Laboratory : Environmental Division Melbourne
Contact : Peter Ravlic
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +6138549 9645
Date Samples Received : 11-Oct-2024 12:10
Date Analysis Commenced : 15-Oct-2024
Issue Date : 22-Oct-2024 11:46



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

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



General Comments

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

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

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

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

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

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

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

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO₂ and Fluoride to the Anions.
- EP231X-SUT: Poor surrogate recovery for samples EM2417600_04, 11 due to matrix interferences.
- EP231X-SUT: Particular samples required dilution prior to analysis due to matrix interferences. LOR values have been adjusted accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW01	MW02	MW03	MW04	MW05
Sampling date / time				08-Oct-2024 00:00	08-Oct-2024 00:00	08-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	EM2417600-001	EM2417600-002	EM2417600-003	EM2417600-004	EM2417600-005
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	2050	----
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	2050	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	1400	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	----	8830	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	----	136	----
Magnesium	7439-95-4	1	mg/L	----	----	----	450	----
Sodium	7440-23-5	1	mg/L	----	----	----	6170	----
Potassium	7440-09-7	1	mg/L	----	----	----	313	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.008	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.010	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.023	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.018	----
Lead	7439-92-1	0.001	mg/L	----	----	----	0.011	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.037	----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.063	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.061	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.053	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.041	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
Sampling date / time					08-Oct-2024 00:00	08-Oct-2024 00:00	08-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417600-001	EM2417600-002	EM2417600-003	EM2417600-004	EM2417600-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Lead	7439-92-1	0.001	mg/L		----	----	----	0.022	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	0.094	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	----	2.73	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	----	0.20	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	----	10.1	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	----	10.3	----
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		----	----	----	319	----
ø Total Cations	----	0.01	meq/L		----	----	----	320	----
ø Ionic Balance	----	0.01	%		----	----	----	0.16	----
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002	µg/L		0.211	----	----	15.6	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002	µg/L		0.164	----	----	15.4	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002	µg/L		0.416	----	----	83.4	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002	µg/L		0.078	----	----	3.25	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L		1.45	----	----	37.0	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.002	µg/L		<0.002	----	----	<0.002	----

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
Sampling date / time				08-Oct-2024 00:00	08-Oct-2024 00:00	08-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	
Compound	CAS Number	LOR	Unit	EM2417600-001	EM2417600-002	EM2417600-003	EM2417600-004	EM2417600-005	
				Result	Result	Result	Result	Result	
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.01	µg/L	0.20	----	----	15.4	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002	µg/L	0.164	----	----	14.8	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.002	µg/L	0.495	----	----	52.8	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002	µg/L	0.061	----	----	3.45	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L	0.028	----	----	4.83	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L	<0.002	----	----	0.041	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L	<0.002	----	----	<0.002	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L	<0.002	----	----	<0.002	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L	<0.002	----	----	<0.002	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.002	µg/L	<0.002	----	----	<0.002	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L	<0.005	----	----	<0.005	----	
EP231_TOP_C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L	<0.002	----	----	0.016	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L	<0.005	----	----	<0.005	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L	<0.005	----	----	<0.005	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.005	µg/L	<0.005	----	----	<0.005	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L	<0.005	----	----	<0.005	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L	<0.002	----	----	<0.002	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L	<0.002	----	----	<0.002	----	
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids									



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW01	MW02	MW03	MW04	MW05
Sampling date / time				08-Oct-2024 00:00	08-Oct-2024 00:00	08-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	EM2417600-001	EM2417600-002	EM2417600-003	EM2417600-004	EM2417600-005
				Result	Result	Result	Result	Result
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L	<0.005	----	----	<0.005	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L	0.006	----	----	0.045	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L	<0.005	----	----	<0.005	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L	<0.005	----	----	<0.005	----
EP231_TOP_P: PFAS Sums								
Sum of PFAS	----	0.002	µg/L	3.38	----	----	254	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.002	µg/L	1.87	----	----	120	----
^ Sum of TOP C4 - C14 as Fluorine	----	0.002	µg/L	2.08	----	----	156	----
Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfonates	----	0.002	µg/L	3.27	----	----	246	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	0.215	3.17	1.63	13.5	<0.0005
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	0.180	1.87	1.13	13.9	0.0050
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	0.414	6.38	3.60	73.7	0.0186
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	0.0778	0.125	0.0996	2.82	0.0012
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L	1.73	0.545	0.380	36.4	0.0256
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.0020	µg/L	0.0800	1.03	0.396	3.77	<0.0020
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	0.119	1.81	0.620	7.04	0.0008
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	0.0618	0.266	0.107	3.20	<0.0005
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	0.378	5.33	2.03	31.1	0.0044



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW01	MW02	MW03	MW04	MW05
Sampling date / time				08-Oct-2024 00:00	08-Oct-2024 00:00	08-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	EM2417600-001	EM2417600-002	EM2417600-003	EM2417600-004	EM2417600-005
				Result	Result	Result	Result	Result
EP231B: Perfluoroalkyl Carboxylic Acids - Continued								
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	0.0221	0.200	0.115	4.66	0.0010
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0016	0.0030	<0.0016	0.0377	<0.0005
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0008	<0.0008
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	0.0030	<0.0005	<0.0005	0.0097	<0.0005
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	0.001	0.008	<0.001	1.80	<0.001
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW01	MW02	MW03	MW04	MW05
Sampling date / time					08-Oct-2024 00:00	08-Oct-2024 00:00	08-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417600-001	EM2417600-002	EM2417600-003	EM2417600-004	EM2417600-005
					Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
EP231P: PFAS Sums									
^ Sum of PFHxS and PFOS	355 46-4/1763-23-1	0.0002	µg/L		2.14	6.92	3.98	110	0.0442
^ Sum of PFAS (WA DER List)	----	0.0002	µg/L		3.02	18.7	8.88	175	0.0504
^ Sum of PFAS	----	0.0002	µg/L		3.37	22.4	11.0	198	0.0590
EP231_TOP_S: PFAS Surrogate									
13C4-PFOS	----	0.002	%		70.1	----	----	99.6	----
13C8-PFOA	----	0.002	%		71.8	----	----	85.7	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		78.3	84.6	87.3	45.3	86.6
13C8-PFOA	----	0.0005	%		102	96.9	98.8	87.0	91.8



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				MW06	SW_HYDRANT	SW01	SW02	SW03
Sampling date / time				09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit	EM2417600-006	EM2417600-007	EM2417600-008	EM2417600-009	EM2417600-010
				Result	Result	Result	Result	Result
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	54	55	61
Total Alkalinity as CaCO3	----	1	mg/L	----	----	54	55	61
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	48	46	52
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	----	----	113	113	117
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	15	16	17
Magnesium	7439-95-4	1	mg/L	----	----	12	12	12
Sodium	7440-23-5	1	mg/L	----	----	88	86	87
Potassium	7440-09-7	1	mg/L	----	----	5	4	5
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	----	----	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	0.001	0.002	0.005
Nickel	7440-02-0	0.001	mg/L	----	----	0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	<0.001	0.002	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	0.010	0.031	0.022
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	----	----	0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	0.002	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	0.001	0.003	0.005
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	0.002	0.001



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	SW_HYDRANT	SW01	SW02	SW03
Sampling date / time					09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417600-006	EM2417600-007	EM2417600-008	EM2417600-009	EM2417600-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Lead	7439-92-1	0.001	mg/L		----	----	<0.001	0.003	0.002
Zinc	7440-66-6	0.005	mg/L		----	----	0.008	0.040	0.037
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	<0.0001	<0.0001	<0.0001
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		----	----	0.65	0.68	0.66
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		----	----	0.05	0.05	0.06
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		----	----	0.24	0.25	0.29
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		----	----	0.29	0.30	0.35
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		----	----	5.26	5.24	5.60
∅ Total Cations	----	0.01	meq/L		----	----	5.69	5.63	5.75
∅ Ionic Balance	----	0.01	%		----	----	3.89	3.54	1.29
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L		0.0240	<0.0005	<0.0005	0.0007	0.0045
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L		0.0114	<0.0005	<0.0005	<0.0005	0.0026
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L		0.0619	<0.0005	0.0026	0.0046	0.0268
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L		0.0030	<0.0005	<0.0005	<0.0005	0.0019
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L		0.0372	0.0008	0.0081	0.0120	0.0492
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	SW_HYDRANT	SW01	SW02	SW03
Sampling date / time				09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	
Compound	CAS Number	LOR	Unit	EM2417600-006	EM2417600-007	EM2417600-008	EM2417600-009	EM2417600-010	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.0020	µg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	0.0068	<0.0005	<0.0005	<0.0005	0.0023	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	0.0041	<0.0005	<0.0005	<0.0005	0.0018	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	0.0196	<0.0005	0.0012	0.0018	0.0146	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	0.0088	<0.0005	0.0006	0.0006	0.0031	
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	<0.0008	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW06	SW_HYDRANT	SW01	SW02	SW03
Sampling date / time					09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00
Compound	CAS Number	LOR	Unit		EM2417600-006	EM2417600-007	EM2417600-008	EM2417600-009	EM2417600-010
					Result	Result	Result	Result	Result
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L		0.002	0.002	<0.001	0.001	0.013
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	0.002
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L		<0.001	<0.001	<0.001	<0.001	<0.001
EP231P: PFAS Sums									
^ Sum of PFHxS and PFOS	355 46-4/1763-23-1	0.0002	µg/L		0.0991	0.0008	0.0107	0.0166	0.0760
^ Sum of PFAS (WA DER List)	----	0.0002	µg/L		0.164	0.0028	0.0125	0.0207	0.117
^ Sum of PFAS	----	0.0002	µg/L		0.184	0.0028	0.0125	0.0207	0.122
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0005	%		109	96.3	72.6	75.6	80.1
13C8-PFOA	----	0.0005	%		100	94.0	90.9	93.4	93.0



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				FD01	RB01	FB01	----	----
Sampling date / time				09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2417600-011	EM2417600-013	EM2417600-014	-----	-----
				Result	Result	Result	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	13.2	<0.0005	<0.0005	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	14.3	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	75.3	<0.0005	<0.0005	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	3.05	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L	35.0	<0.0002	<0.0002	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids								
Perfluorobutanoic acid (PFBA)	375-22-4	0.0020	µg/L	3.62	<0.0020	<0.0020	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	6.91	<0.0005	<0.0005	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	3.13	<0.0005	<0.0005	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	30.3	<0.0005	<0.0005	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	4.56	<0.0005	<0.0005	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	0.0364	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0005	µg/L	<0.0005	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0008	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	0.0097	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	----	----	----	----



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				FD01	RB01	FB01	----	----
Sampling date / time				09-Oct-2024 00:00	09-Oct-2024 00:00	09-Oct-2024 00:00	----	----
Compound	CAS Number	LOR	Unit	EM2417600-011	EM2417600-013	EM2417600-014	-----	-----
				Result	Result	Result	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.001	µg/L	<0.001	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0005	µg/L	<0.0005	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0005	µg/L	<0.0005	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.001	µg/L	<0.001	<0.001	<0.001	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.001	µg/L	1.89	<0.001	<0.001	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.001	µg/L	<0.001	<0.001	<0.001	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.001	µg/L	<0.001	<0.001	<0.001	----	----
EP231P: PFAS Sums								
^ Sum of PFHxS and PFOS	355 46-4/1763-23-1	0.0002	µg/L	110	<0.0002	<0.0002	----	----
^ Sum of PFAS (WA DER List)	----	0.0002	µg/L	174	<0.0002	<0.0002	----	----
^ Sum of PFAS	----	0.0002	µg/L	197	----	----	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.0005	%	40.6	85.0	88.8	----	----
13C8-PFOA	----	0.0005	%	89.1	94.1	95.8	----	----



Surrogate Control Limits

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



QUALITY CONTROL REPORT

Work Order	: EM2417600	Page	: 1 of 10
Client	: GHD PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: Terrence Wilson	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	: 12647854	Date Samples Received	: 11-Oct-2024
Order number	: 12647854	Date Analysis Commenced	: 15-Oct-2024
C-O-C number	: ----	Issue Date	: 22-Oct-2024
Sampler	: Joshua Anderson (JA), Louise Wright (LW)		
Site	:		
Quote number	: EN/000		
No. of samples received	: 13		
No. of samples analysed	: 13		



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

This Quality Control Report contains the following information:

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

Signatories

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

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



General Comments

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

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

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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot

CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

RPD = Relative Percentage Difference

= Indicates failed QC

* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **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 (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 6119317)									
EM2417592-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
EM2417664-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	60	66	9.5	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	60	66	9.5	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 6119517)									
EM2417702-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	1	0.0	No Limit
EM2417599-005	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	213	213	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 6119518)									
EM2417599-005	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1460	1470	0.2	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 6125837)									
EM2417599-010	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	15	14	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	11	11	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	80	79	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.0	No Limit
EM2417575-007	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	11	11	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	10	10	0.0	No Limit



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 (%)
ED093F: Dissolved Major Cations (QC Lot: 6125837) - continued									
EM2417575-007	Anonymous	ED093F: Sodium	7440-23-5	1	mg/L	55	55	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	12	12	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 6125838)									
EM2417599-011	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.025	0.024	5.7	No Limit
EM2417575-007	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.038	0.039	0.0	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 6125973)									
EM2417563-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.002	0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.006	0.005	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.006	0.007	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.053	0.054	0.0	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.006	0.006	0.0	No Limit
EM2417600-004	MW04	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0001	0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.063	0.066	4.7	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.061	0.065	7.3	0% - 20%
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.053	0.055	3.5	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.022	0.022	0.0	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.041	0.043	5.2	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.094	0.099	5.1	0% - 50%
EG035F: Dissolved Mercury by FIMS (QC Lot: 6125839)									
EM2417599-011	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EM2417575-007	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 6126134)									
EM2417563-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	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 (%)
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 6126134) - continued									
EM2417600-009	SW02	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 6125475)									
EM2417600-004	MW04	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	2.73	2.77	1.3	0% - 20%
EM2417660-009	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.08	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 6119519)									
EM2417660-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EM2417599-005	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 6125474)									
EM2417437-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	7.64	7.76	1.6	0% - 20%
EM2417600-004	MW04	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	10.3	9.57	7.2	0% - 20%
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids (QC Lot: 6125472)									
EM2417599-001	Anonymous	EP231X-LL: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002 (0.010) *	µg/L	5.64	6.16	8.8	0% - 20%
		EP231X-LL: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002 (0.100) *	µg/L	8.93	9.66	7.9	0% - 20%
		EP231X-LL: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002 (0.100) *	µg/L	75.5	81.5	7.7	0% - 20%
		EP231X-LL: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002 (0.100) *	µg/L	1.07	1.21	12.0	0% - 50%
		EP231X-LL: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002 (0.010) *	µg/L	1.44	1.50	4.6	0% - 20%
		EP231X-LL: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.002	µg/L	<0.002	<0.002	0.0	No Limit
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6125472)									
EM2417599-001	Anonymous	EP231X-LL: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002 (0.010) *	µg/L	6.97	7.34	5.2	0% - 20%
		EP231X-LL: Perfluorohexanoic acid (PFHxA)	307-24-4	0.002 (0.100) *	µg/L	26.0	29.2	11.7	0% - 20%
		EP231X-LL: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002 (0.100) *	µg/L	1.24	1.31	5.4	0% - 50%
		EP231X-LL: Perfluorooctanoic acid (PFOA)	335-67-1	0.002 (0.010) *	µg/L	1.63	1.84	12.1	0% - 20%
		EP231X-LL: Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L	0.008	0.008	0.0	No Limit
		EP231X-LL: Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L	<0.005	<0.005	0.0	No Limit

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 Work Order : EM2417600
 Client : GHD PTY LTD
 Project : 12647854



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids (QC Lot: 6125472) - continued									
EM2417599-001	Anonymous	EP231X-LL: Perfluorobutanoic acid (PFBA)	375-22-4	0.01 (0.05)*	µg/L	4.83	5.29	9.2	0% - 20%
EP231_TOP_C: Perfluoroalkyl Sulfonamides (QC Lot: 6125472)									
EM2417599-001	Anonymous	EP231X-LL: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L	<0.002	<0.002	0.0	No Limit
		EP231X-LL: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L	<0.005	<0.005	0.0	No Limit
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 6125472)									
EM2417599-001	Anonymous	EP231X-LL: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L	0.023	0.006	120	No Limit
		EP231X-LL: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L	<0.005	<0.005	0.0	No Limit
		EP231X-LL: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L	<0.005	<0.005	0.0	No Limit



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

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

Sub-Matrix: **WATER**

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				
ED037P: Alkalinity by PC Titrator (QCLot: 6119317)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	103	85.0	116
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6119517)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	500 mg/L	105	90.0	110
				<1	25 mg/L	102	90.0	110
ED045G: Chloride by Discrete Analyser (QCLot: 6119518)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	1000 mg/L	104	90.0	110
				<1	10 mg/L	108	90.0	110
ED093F: Dissolved Major Cations (QCLot: 6125837)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	93.1	80.0	120
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	104	80.0	120
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	80.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.4	80.0	120
EG020F: Dissolved Metals by ICP-MS (QCLot: 6125838)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.3	89.0	111
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.4	83.5	111
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.5	83.2	109
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.8	83.1	107
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.9	84.6	108
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.0	84.3	110
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	101	86.3	112
EG020T: Total Metals by ICP-MS (QCLot: 6125973)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.6	89.2	110
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.4	86.4	115
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.0	89.0	112
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.6	88.3	111
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.4	88.3	112
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.0	88.8	113
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.4	90.0	115
EG035F: Dissolved Mercury by FIMS (QCLot: 6125839)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.5	71.6	116



Sub-Matrix: **WATER**

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				
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6126134)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	73.4	119
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6125475)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	107	90.0	110
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6119519)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	90.0	110
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6125474)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	109	90.0	110
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids (QCLot: 6125472)								
EP231X-LL: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.002	µg/L	<0.002	0.475 µg/L	71.8	44.9	136
EP231X-LL: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.002	µg/L	<0.002	0.465 µg/L	73.2	33.2	116
EP231X-LL: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.002	µg/L	<0.002	----	----	----	----
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids (QCLot: 6125472)								
EP231X-LL: Perfluorobutanoic acid (PFBA)	375-22-4	0.01	µg/L	<0.01	----	----	----	----
EP231X-LL: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorohexanoic acid (PFHxA)	307-24-4	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorooctanoic acid (PFOA)	335-67-1	0.002	µg/L	<0.002	0.5 µg/L	71.4	47.0	123
EP231X-LL: Perfluorononanoic acid (PFNA)	375-95-1	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorodecanoic acid (PFDA)	335-76-2	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.005	µg/L	<0.005	----	----	----	----
EP231_TOP_C: Perfluoroalkyl Sulfonamides (QCLot: 6125472)								
EP231X-LL: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.005	µg/L	<0.005	----	----	----	----



Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP231_TOP_C: Perfluoroalkyl Sulfonamides (QCLot: 6125472) - continued								
EP231X-LL: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.002	µg/L	<0.002	----	----	----	----
EP231X-LL: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.002	µg/L	<0.002	----	----	----	----
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 6125472)								
EP231X-LL: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.005	µg/L	<0.005	0.05 µg/L	22.0	0	200
EP231X-LL: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.005	µg/L	<0.005	----	----	----	----
EP231X-LL: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.005	µg/L	<0.005	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 6126975)								
EP231X-SUT: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0005	µg/L	<0.0005	0.00355 µg/L	85.5	72.0	130
EP231X-SUT: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0005	µg/L	<0.0005	0.00376 µg/L	95.0	71.0	127
EP231X-SUT: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0005	µg/L	<0.0005	0.00379 µg/L	87.8	68.0	131
EP231X-SUT: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0005	µg/L	<0.0005	0.00381 µg/L	95.5	69.0	134
EP231X-SUT: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	µg/L	<0.0002	0.00371 µg/L	92.4	65.0	140
EP231X-SUT: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0005	µg/L	<0.0005	0.00385 µg/L	88.6	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 6126975)								
EP231X-SUT: Perfluorobutanoic acid (PFBA)	375-22-4	0.002	µg/L	<0.0020	0.02 µg/L	92.7	73.0	129
EP231X-SUT: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0005	µg/L	<0.0005	0.004 µg/L	92.3	72.0	129
EP231X-SUT: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0005	µg/L	<0.0005	0.004 µg/L	89.9	72.0	129
EP231X-SUT: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0005	µg/L	<0.0005	0.004 µg/L	87.7	72.0	130
EP231X-SUT: Perfluorooctanoic acid (PFOA)	335-67-1	0.0005	µg/L	<0.0005	0.004 µg/L	95.4	71.0	133
EP231X-SUT: Perfluorononanoic acid (PFNA)	375-95-1	0.0005	µg/L	<0.0005	0.004 µg/L	104	69.0	130
EP231X-SUT: Perfluorodecanoic acid (PFDA)	335-76-2	0.0005	µg/L	<0.0005	0.004 µg/L	93.5	71.0	129
EP231X-SUT: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	92.6	69.0	133
EP231X-SUT: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0005	µg/L	<0.0005	0.004 µg/L	103	72.0	134
EP231X-SUT: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.0005	µg/L	<0.0005	0.004 µg/L	107	65.0	144
EP231X-SUT: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	µg/L	<0.0005	0.01 µg/L	94.3	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 6126975)								
EP231X-SUT: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0005	µg/L	<0.0005	0.004 µg/L	95.9	67.0	137
EP231X-SUT: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.001	µg/L	<0.001	0.01 µg/L	105	68.0	141
EP231X-SUT: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.001	µg/L	<0.001	0.01 µg/L	98.2	70.0	130
EP231X-SUT: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.001	µg/L	<0.001	0.01 µg/L	94.2	70.0	130

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
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 6119517)							
EM2417599-009	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	80.6	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 6119518)							
EM2417599-009	Anonymous	ED045G: Chloride	16887-00-6	400 mg/L	112	70.0	142
EG020F: Dissolved Metals by ICP-MS (QCLot: 6125838)							
EM2417575-007	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	91.6	76.6	124
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	94.8	74.6	118
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	97.1	71.0	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	90.5	76.0	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	92.6	75.0	133
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	91.6	73.0	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	94.8	75.0	131
EG020T: Total Metals by ICP-MS (QCLot: 6125973)							

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 Work Order : EM2417600
 Client : GHD PTY LTD
 Project : 12647854



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
EG020T: Total Metals by ICP-MS (QCLot: 6125973) - continued							
EM2417563-001	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	103	82.0	123
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	107	81.8	123
		EG020A-T: Chromium	7440-47-3	1 mg/L	101	78.9	119
		EG020A-T: Copper	7440-50-8	1 mg/L	102	80.4	118
		EG020A-T: Lead	7439-92-1	1 mg/L	105	80.5	121
		EG020A-T: Nickel	7440-02-0	1 mg/L	102	80.0	118
		EG020A-T: Zinc	7440-66-6	1 mg/L	102	74.0	120
EG035F: Dissolved Mercury by FIMS (QCLot: 6125839)							
EM2417575-008	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	90.9	70.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 6126134)							
EM2417563-002	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	98.5	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 6125475)							
EM2417600-008	SW01	EK055G: Ammonia as N	7664-41-7	1 mg/L	96.7	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 6119519)							
EM2417599-009	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	88.6	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 6125474)							
EM2417600-008	SW01	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	100	70.0	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EM2417600**

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Client : **GHD PTY LTD**

Laboratory : Environmental Division Melbourne

Contact : Terrence Wilson

Telephone : +6138549 9645

Project : 12647854

Date Samples Received : 11-Oct-2024

Site :

Issue Date : 22-Oct-2024

Sampler : Joshua Anderson (JA), Louise Wright (LW)

No. of samples received : 13

Order number : 12647854

No. of samples analysed : 13

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.
- Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Regular Sample Surrogates

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP231S: PFAS Surrogate	EM2417600-004	MW04	13C4-PFOS	----	45.3 %	70.0-130 %	Recovery less than lower data quality objective
EP231S: PFAS Surrogate	EM2417600-011	FD01	13C4-PFOS	----	40.6 %	70.0-130 %	Recovery less than lower data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural							
MW04,	SW01,	----	----	----	15-Oct-2024	11-Oct-2024	4
SW02,	SW03						

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

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

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

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

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

Matrix: **WATER**

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

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	16-Oct-2024	23-Oct-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	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	15-Oct-2024	06-Nov-2024	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	15-Oct-2024	06-Nov-2024	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	17-Oct-2024	06-Nov-2024	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	17-Oct-2024	07-Apr-2025	✓
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) MW04, SW02,	SW01, SW03	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	17-Oct-2024	06-Nov-2024	✓
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	17-Oct-2024	06-Nov-2024	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	17-Oct-2024	06-Nov-2024	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	15-Oct-2024	11-Oct-2024	✗
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) MW04, SW02,	SW01, SW03	09-Oct-2024	----	----	----	17-Oct-2024	06-Nov-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	
EP231_TOP_A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X-LL (TOP)) MW01	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓	
HDPE (no PTFE) (EP231X-LL (TOP)) MW04	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓	
EP231_TOP_B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X-LL (TOP)) MW01	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓	
HDPE (no PTFE) (EP231X-LL (TOP)) MW04	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓	
EP231_TOP_C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-LL (TOP)) MW01	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓	
HDPE (no PTFE) (EP231X-LL (TOP)) MW04	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓	
EP231_TOP_D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-LL (TOP)) MW01	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓	
HDPE (no PTFE) (EP231X-LL (TOP)) MW04	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓	
EP231_TOP_P: PFAS Sums								
HDPE (no PTFE) (EP231X-LL (TOP)) MW01	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓	
HDPE (no PTFE) (EP231X-LL (TOP)) MW04	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X-SUT) MW01, MW03	MW02,	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓
HDPE (no PTFE) (EP231X-SUT) MW04, MW06, SW01, SW03, RB01,	MW05, SW_HYDRANT, SW02, FD01, FB01	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓



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
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X-SUT) MW01, MW03	MW02,	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓
HDPE (no PTFE) (EP231X-SUT) MW04, MW06, SW01, SW03, RB01,	MW05, SW_HYDRANT, SW02, FD01, FB01	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X-SUT) MW01, MW03	MW02,	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓
HDPE (no PTFE) (EP231X-SUT) MW04, MW06, SW01, SW03,	MW05, SW_HYDRANT, SW02, FD01	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X-SUT) MW01, MW03	MW02,	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓
HDPE (no PTFE) (EP231X-SUT) MW04, MW06, SW01, SW03, RB01,	MW05, SW_HYDRANT, SW02, FD01, FB01	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X-SUT) MW01, MW03	MW02,	08-Oct-2024	17-Oct-2024	06-Apr-2025	✓	17-Oct-2024	06-Apr-2025	✓
HDPE (no PTFE) (EP231X-SUT) MW04, MW06, SW01, SW03, RB01,	MW05, SW_HYDRANT, SW02, FD01, FB01	09-Oct-2024	17-Oct-2024	07-Apr-2025	✓	17-Oct-2024	07-Apr-2025	✓



Quality Control Parameter Frequency Compliance

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

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	13	0.00	10.00	✗	NEPM 2013 B3 & ALS QC Standard
PFAS by LCMSMS after SPE and oxidation (TOP)	EP231X-LL (TOP)	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	8	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
PFAS by LCMSMS after SPE and oxidation (TOP)	EP231X-LL (TOP)	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification .

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
PFAS by LCMSMS after SPE and oxidation (TOP)	EP231X-LL (TOP)	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X-SUT	0	13	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

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

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45µm filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)



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

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

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

Sample Receipt Advice

Company name: GHD Pty Ltd SA
Contact name: Terrance Wilson
Project name: MFS PORT AUGUSTA FURTHER DSI
Project ID: 12647854
Turnaround time: 5 Day
Date/Time received: Oct 4, 2024 5:00 PM
Eurofins reference: 1146138

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

QA5 NOT RECD

Contact

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

Karl Bulow on phone : or by email: KarlBulow@eurofins.com

Results will be delivered electronically via email to Terrance Wilson - Terrence.Wilson@ghd.com.

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



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

CLIENT: GHD

OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000

TURNAROUND REQUIREMENTS :

☐ Standard TAT (List due date): 9/10/2024

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

ALS QUOTE:

ORDER NO.:

PROJECT: MFS Port Augusta Further DSI (12647854)

PROJECT MANAGER: Terrence Wilson

SAMPLER: Louise Wright (LW), Sam Marsh (SM)

COC emailed to ALS? (YES / NO)

Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

CONTACT PH: 0467 034 756

SAMPLER MOBILE: 0413 631 886

RELINQUISHED BY: Louise Wright

DATE/TIME: 30/09/2024 8:30am

RECEIVED BY:

DATE/TIME: 04/10/24

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?

Free ice / frozen ice bricks present upon receipt?

Random Sample Temperature on Receipt:

Other comment:

Yes

No

N/A

Yes

No

N/A

°C

lake H

4/10/24

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.

ALS Environmental

CHAIN OF CUSTODY

ALS Laboratory:
please tick →

CLIENT: GHD

OFFICE: Level 4, 211 Victoria Square Adelaide SA 5000

TURNAROUND REQUIREMENTS :

☐ Standard TAT (List due date): 9/10/2024

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

ALS QUOTE:

ORDER NO.:

PROJECT: MFS Port Augusta Further DSI (12647854)

PROJECT MANAGER: Terrence Wilson

SAMPLER: Louise Wright (LW), Sam Marsh (SM)

COC emailed to ALS? (YES / NO)

Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@ghd.com

CONTACT PH: 0467 034 756

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Other comment:

Yes

No

N/A

Yes

No

N/A

°C

lake H

4/10/24

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 →

GADELADE 1/11 (Barra Road) Perth WA 6000
Ph: 08 9445 1111 E: adelaide@alsglobal.com
LURFAME 32 (Shed Street) Stirling QLD 4051
Ph: 07 3243 7222 E: samuel.emberton@alsglobal.com
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Ph: 07 3471 1500 E: bston@alsglobal.com

GLADSTONE 78 (Woods Road) Gladstone QLD 4740
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Ph: 03 5469 9600 E: sam@als.melbourne@alsglobal.com
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GLADSTONE 1/1 (Woods Road) Gladstone NSW 2300
Ph: 02 4944 6122 E: gladstone@alsglobal.com
GLADSTONE 1/1 (Woods Road) Gladstone NSW 2300
Ph: 02 4944 6122 E: gladstone@alsglobal.com

CLIENT: GHD	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (List due date): 9/10/2024 ☐ 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: Level 4, 211 Victoria Square Adelaide SA 5000	ALS QUOTE:	COC SEQUENCE NUMBER (Circle) COC: X 9 10 11 12 13 14 OF: 8	
PROJECT: MFS Port Augusta Further DSI (12647854)	ORDER NO.:		
PROJECT MANAGER: Terrence Wilson	CONTACT PH: 0467 034 756		
SAMPLER: Louise Wright (LW), Sam Marsh (SM)	SAMPLER MOBILE: 0413 631 886	RELINQUISHED BY: Louise Wright	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 30/09/2024, 8:30am	DATE/TIME:
Email Reports to: GHDLabReports@ghd.com, terrence.wilson@ghd.com			
Email Invoice to: GHDLabReports@ghd.com, terrence.wilson@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 (filtered bottle required).										Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL CONTAINERS	PFAS Extended Suite - 30 PFAS (Standard LOR) sed and soil	PFAS Short Suite - PFOS	HOLD								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
77	QC03	24/09/2024	S		1	X										
78	QA03	24/09/2024	S		1	X										Please Forward to Eurofins ✓
79	QC04	24/09/2024	S		1		X									
80	QA04	24/09/2024	S		1		X									
81	QC05	N.R.	S		1	X										
82	QA05	N.R.	S		1	X										Forward to Eurofins X
83	FB01	23/09/2024	W		1	X										
84	RB01	23/09/2024	W		1	X										
85	FB02	24/09/2024	W		1	X										
86	RB02	24/09/2024	W		1	X										
TOTAL					10	8	2									

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.



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

ABN: 50 005 085 521

ABN: 91 05 0159 898

NZBN: 9429046024954

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554	Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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Company Name:

Address:

Project Name:

Project ID:

GHD Pty Ltd SA

GPO Box 2052

Adelaide

SA 5001

MFS PORT AUGUSTA FURTHER DSI

12647854

Order No.:

Report #:

Phone:

Fax:

1146138

08 8111 6600

08 8111 6699

08 8111 6699

Received:

Due:

Priority:

Contact Name:

Oct 4, 2024 5:00 PM

Oct 11, 2024

5 Day

Terrance Wilson

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	QA01	Sep 23, 2024		Soil	M24-Oc0013158	X	X
2	QA02	Sep 23, 2024		Soil	M24-Oc0013159	X	X
3	QA03	Sep 24, 2024		Soil	M24-Oc0013160	X	X
Test Counts						3	3

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: **Terrance Wilson**

Report **1146138-S**
Project name **MFS PORT AUGUSTA FURTHER DSI**
Project ID **12647854**
Received Date **Oct 04, 2024**

Client Sample ID			QA01	QA02	QA03
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M24- Oc0013158	M24- Oc0013159	M24- Oc0013160
Date Sampled			Sep 23, 2024	Sep 23, 2024	Sep 24, 2024
Test/Reference	LOR	Unit			
Sample Properties					
% Moisture	1	%	17	7.6	11
Perfluoroalkyl carboxylic acids (PFCAs)					
Perfluorobutanoic acid (PFBA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluoropentanoic acid (PFPeA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluorohexanoic acid (PFHxA) ^{N11}	5	ug/kg	11	< 5	< 5
Perfluoroheptanoic acid (PFHpA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluorooctanoic acid (PFOA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluorononanoic acid (PFNA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluorodecanoic acid (PFDA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluoroundecanoic acid (PFUnDA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluorododecanoic acid (PFDoDA) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluorotridecanoic acid (PFTTrDA) ^{N15}	5	ug/kg	< 5	< 5	< 5
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	5	ug/kg	< 5	< 5	< 5
13C4-PFBA (surr.)	1	%	99	100	103
13C5-PFPeA (surr.)	1	%	110	113	111
13C5-PFHxA (surr.)	1	%	101	104	109
13C4-PFHpA (surr.)	1	%	93	98	99
13C8-PFOA (surr.)	1	%	97	98	99
13C5-PFNA (surr.)	1	%	100	99	104
13C6-PFDA (surr.)	1	%	98	90	97
13C2-PFUnDA (surr.)	1	%	94	90	96
13C2-PFDoDA (surr.)	1	%	89	80	91
13C2-PFTeDA (surr.)	1	%	111	98	100
Perfluoroalkyl sulfonamido substances					
Perfluorooctane sulfonamide (FOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	5	ug/kg	< 5	< 5	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	5	ug/kg	< 5	< 5	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	10	ug/kg	< 10	< 10	< 10

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	QA01 Soil M24- Oc0013158 Sep 23, 2024	QA02 Soil M24- Oc0013159 Sep 23, 2024	QA03 Soil M24- Oc0013160 Sep 24, 2024
Perfluoroalkyl sulfonamido substances					
13C8-FOSA (surr.)	1	%	92	93	95
D3-N-MeFOSA (surr.)	1	%	102	99	100
D5-N-EtFOSA (surr.)	1	%	115	111	112
D7-N-MeFOSE (surr.)	1	%	117	131	121
D9-N-EtFOSE (surr.)	1	%	99	92	92
D5-N-EtFOSAA (surr.)	1	%	76	106	106
D3-N-MeFOSAA (surr.)	1	%	93	124	126
Perfluoroalkyl sulfonic acids (PFSA's)					
Perfluorobutanesulfonic acid (PFBS) ^{N11}	5	ug/kg	< 5	< 5	< 5
Perfluorononanesulfonic acid (PFNS) ^{N15}	5	ug/kg	< 5	< 5	< 5
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	5	ug/kg	< 5	< 5	< 5
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	5	ug/kg	< 5	< 5	< 5
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	5	ug/kg	33	< 5	< 5
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	5	ug/kg	< 5	< 5	< 5
Perfluorooctanesulfonic acid (PFOS) ^{N11}	5	ug/kg	^{N09} 34	^{N09} 15	^{N09} < 5
Perfluorodecanesulfonic acid (PFDS) ^{N15}	5	ug/kg	< 5	< 5	< 5
13C3-PFBS (surr.)	1	%	88	94	95
18O2-PFHxS (surr.)	1	%	87	85	90
13C8-PFOS (surr.)	1	%	62	61	59
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
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	10	ug/kg	< 10	< 10	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	5	ug/kg	< 5	< 5	< 5
13C2-4:2 FTSA (surr.)	1	%	101	136	106
13C2-6:2 FTSA (surr.)	1	%	83	91	85
13C2-8:2 FTSA (surr.)	1	%	123	132	125
13C2-10:2 FTSA (surr.)	1	%	115	112	114
PFASs Summations					
Sum (PFHxS + PFOS)*	5	ug/kg	67	15	< 5
Sum of US EPA PFAS (PFOS + PFOA)*	5	ug/kg	34	15	< 5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	5	ug/kg	67	15	< 5
Sum of WA DWER PFAS (n=10)*	10	ug/kg	78	15	< 10
Sum of PFASs (n=30)*	50	ug/kg	78	< 50	< 50

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
% Moisture	Melbourne	Oct 04, 2024	14 Days
- Method: LTM-GEN-7080 Moisture			
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Melbourne	Oct 07, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Melbourne	Oct 07, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Melbourne	Oct 07, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Melbourne	Oct 07, 2024	28 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
PFASs Summations	Melbourne	Oct 04, 2024	
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			



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ABN: 91 05 0159 898

NZBN: 9429046024954

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554	Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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Company Name:
Address:

Project Name:
Project ID:

GHD Pty Ltd SA
GPO Box 2052
Adelaide
SA 5001

MFS PORT AUGUSTA FURTHER DSI
12647854

Order No.:
Report #:
Phone:
Fax:

1146138
08 8111 6600
08 8111 6699

Received:
Due:
Priority:
Contact Name:

Oct 4, 2024 5:00 PM
Oct 11, 2024
5 Day
Terrance Wilson

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Moisture Set	Per- and Polyfluoroalkyl Substances (PFASs)
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	QA01	Sep 23, 2024		Soil	M24-Oc0013158	X	X
2	QA02	Sep 23, 2024		Soil	M24-Oc0013159	X	X
3	QA03	Sep 24, 2024		Soil	M24-Oc0013160	X	X
Test Counts						3	3

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<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 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	ug/kg	< 5			5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 5			5	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 5			5	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 5			5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5			5	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 5			5	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 5			5	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/kg	< 5			5	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/kg	< 5			5	Pass	
Perfluorotridecanoic acid (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 (PFSA's)							
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's)							
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)	%	104			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	107			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	103			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	107			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	100			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	107			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	110			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	118			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	114			50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	104			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	108			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances									
Perfluorooctane sulfonamide (FOSA)			%	105			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	106			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	104			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	85			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	99			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	94			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	108			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)									
Perfluorobutanesulfonic acid (PFBS)			%	98			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	105			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	143			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	114			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	93			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	110			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	94			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	110			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA's)									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	103			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	109			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	97			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	103			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs)									
				Result 1					
Perfluorobutanoic acid (PFBA)	M24-Oc0013158	CP	%	105			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M24-Oc0013158	CP	%	112			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M24-Oc0013158	CP	%	102			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-Oc0013158	CP	%	109			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M24-Oc0013158	CP	%	104			50-150	Pass	
Perfluorononanoic acid (PFNA)	M24-Oc0013158	CP	%	108			50-150	Pass	
Perfluorodecanoic acid (PFDA)	M24-Oc0013158	CP	%	111			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	M24-Oc0013158	CP	%	115			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	M24-Oc0013158	CP	%	122			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	M24-Oc0013158	CP	%	114			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M24-Oc0013158	CP	%	115			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances									
				Result 1					
Perfluorooctane sulfonamide (FOSA)	M24-Oc0013158	CP	%	110			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M24-Oc0013158	CP	%	112			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M24-Oc0013158	CP	%	108			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M24-Oc0013158	CP	%	79			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M24-Oc0013158	CP	%	104			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M24-Oc0013158	CP	%	103			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M24-Oc0013158	CP	%	112			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSA's)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M24-Oc0013158	CP	%	101			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M24-Oc0013158	CP	%	130			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M24-Oc0013158	CP	%	150			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M24-Oc0013158	CP	%	124			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M24-Oc0013158	CP	%	107			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M24-Oc0013158	CP	%	125			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M24-Oc0010190	NCP	%	101			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M24-Oc0013158	CP	%	136			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)	M24-Oc0013158	CP	%	100			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-Oc0013158	CP	%	105			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M24-Oc0013158	CP	%	98			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M24-Oc0013158	CP	%	95			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	M24-Oc0010187	NCP	%	4.8	5.0	4.2	30%	Pass	
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M24-Oc0013159	CP	ug/kg	< 10	< 10	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M24-Oc0013159	CP	ug/kg	< 10	< 10	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M24-Oc0013159	CP	ug/kg	15	17	13	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M24-Oc0013159	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)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-Oc0013159	CP	ug/kg	< 10	< 10	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M24-Oc0013159	CP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M24-Oc0013159	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	No
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

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

Authorised by:

Catherine Wilson	Analytical Services Manager
Joseph Edouard	Senior Analyst-PFAS



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

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

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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

Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

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

Sample Receipt Advice

Company name:	GHD Pty Ltd SA
Contact name:	Terrance Wilson
Project name:	Not provided
Project ID:	12647854
Turnaround time:	5 Day
Date/Time received	Oct 14, 2024 4:25 PM
Eurofins reference	1148893

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:

Karl Bulow on phone : or by email: KarlBulow@eurofins.com

Results will be delivered electronically via email to Terrance Wilson - Terrence.Wilson@ghd.com.

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

ALS Laboratory:
please tick →

NEWCASTLE 5 Rose Gum Road Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle5@alglobal.com

OFFICE: Adelaide

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

COC SEQUENCE NUMBER (Circle)

ORDER NO.:

CONTACT PH: 0467 034 756

SAMPLER MOBILE: +61 8 8111 6710

EDD FORMAT (or default): Esdat

RELINQUISHED BY:

Louise Wright

DATE/TIME: 10/10/2024, 4pm

RECEIVED BY:

Kieren Burns

DATE/TIME:

RELINQUISHED BY:

RECEIVED BY:

DATE/TIME:

DATE/TIME:

Email Invoice to: accountspayableAU@ghd.com

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

[illegible]

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

Preserved; VB = Vial Vial Sodium Bisulfate Preserved; VS = VOA Vial Sodium Bisulfate 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; Preserved Bottle; G = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulfate Soils; B = Unreserved Bag.

CLIENT / SENDER:	GHD	COC SEQUENCE NUMBER (Circle)	Comments:
PROJECT:	12647854		
CONTACT NAME:		COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	FREIGHT
CONTACT NUMBER:		SAMPLES RECEIVED BY:	
CARRIER:		DATE/TIME: 22-5	
CONNOTE REFERENCE:		ANALYSIS RECEIVED BY: <i>[Signature]</i>	
SAMPLER:	JA/CW	DATE/TIME: 7/10 12-00	
NUMBER OF SAMPLES/MATRIX:			
Client services notified by:			

 $\frac{1}{3}$ [illegible]

Richard Baez

From:

Sent:

To:

Cc:

Subject:

Attachments:

Joshua Anderson <Joshua.Anderson2@ghd.com>
Monday, 14 October 2024 11:21 AM
Kieren Burns
Peter Ravlic; Terrence Wilson
[EXTERNAL] - 12647853/4 COC's
12647854_MFS Port Augusta Supp DSL_GW_COC.xlsx; 12647853_MFS Peterborough
Supp DSL_GW_COC.xlsx

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 attached the COC's for samples delivered Thursday last week,

Any questions please reach out,

Cheers,

Joshua Anderson
Undergraduate Environmental Scientist
Environment and Planning Team

GHD

Proudly employee-owned | ghd.com

Level 4, 211 Victoria sq, Adelaide, 5000, Australia

D +61 8 8111 6710 E Joshua.Anderson2@ghd.com



GHD acknowledges the Traditional Owners of Country throughout Australia.
We pay respect to their continuing culture and Elders past, present and emerging.
[Click here to learn about our Reconciliation Action Plan.](#)



I acknowledge the Traditional Custodians of the lands on which I work, the Kaurna people of the Adelaide Plains (when working in the office), and pay my respects to their Elders past, present and emerging. Extending this same respect to all Aboriginal and Torres Strait Islander People

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

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554	Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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Company Name:

Address:

Project Name:

Project ID:

GHD Pty Ltd SA

GPO Box 2052

Adelaide

SA 5001

12647854

Order No.:

Report #:

Phone:

Fax:

1148893

08 8111 6600

08 8111 6699

Received:

Due:

Priority:

Contact Name:

Oct 14, 2024 4:25 PM

Oct 21, 2024

5 Day

Terrance Wilson

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						Per- and Polyfluoroalkyl Substances (PFASs) - Ultra Trace	
Melbourne Laboratory - NATA # 1261 Site # 1254							X
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	FS01	Oct 09, 2024		Water	M24-Oc0033948	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: **Terrance Wilson**

Report **1148893-W**

Project name

Project ID **12647854**

Received Date **Oct 14, 2024**

Client Sample ID			FS01
Sample Matrix			Water
Eurofins Sample No.			M24- Oc0033948
Date Sampled			Oct 09, 2024
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace			
Perfluorobutanoic acid (PFBA) ^{N11}	0.005	ug/L	0.46
Perfluorodecanoic acid (PFDA) ^{N11}	0.001	ug/L	< 0.001
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.001	ug/L	< 0.001
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.001	ug/L	^{N09} 2.7
Perfluorohexanoic acid (PFHxA) ^{N11}	0.001	ug/L	33
Perfluorononanoic acid (PFNA) ^{N11}	0.001	ug/L	< 0.0625
Perfluorooctanoic acid (PFOA) ^{N11}	0.001	ug/L	^{N09} 4.1
Perfluoropentanoic acid (PFPeA) ^{N11}	0.001	ug/L	5.9
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.001	ug/L	< 0.001
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.001	ug/L	< 0.001
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.001	ug/L	< 0.001
13C4-PFBA (surr.)	1	%	149
13C5-PFPeA (surr.)	1	%	144
13C5-PFHxA (surr.)	1	%	125
13C4-PFHpA (surr.)	1	%	130
13C8-PFOA (surr.)	1	%	122
13C5-PFNA (surr.)	1	%	121
13C6-PFDA (surr.)	1	%	44
13C2-PFUnDA (surr.)	1	%	94
13C2-PFDoDA (surr.)	1	%	68
13C2-PFTeDA (surr.)	1	%	52
Perfluoroalkyl sulfonic acids (PFSA)s- Ultra Trace			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.001	ug/L	15
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.001	ug/L	< 0.0625
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.001	ug/L	6.9
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.001	ug/L	^{N09} 13
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.001	ug/L	^{N09} 80
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.001	ug/L	^{N09} 2.3
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.0001	ug/L	39
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.001	ug/L	< 0.001
13C3-PFBS (surr.)	1	%	118
18O2-PFHxS (surr.)	1	%	110
13C8-PFOS (surr.)	1	%	125

Client Sample ID			FS01
Sample Matrix			Water
Eurofins Sample No.			M24- Oc0033948
Date Sampled			Oct 09, 2024
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonamido substances- Ultra Trace			
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE) ^{N11}	0.005	ug/L	< 0.005
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE) ^{N11}	0.005	ug/L	< 0.005
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.005	ug/L	< 0.005
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.005	ug/L	< 0.005
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.005	ug/L	< 0.005
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.005	ug/L	< 0.005
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.005	ug/L	^{N09} 0.013
13C8-FOSA (surr.)	1	%	130
D3-N-MeFOSA (surr.)	1	%	81
D5-N-EtFOSA (surr.)	1	%	71
D7-N-MeFOSE (surr.)	1	%	79
D9-N-EtFOSE (surr.)	1	%	71
D5-N-EtFOSAA (surr.)	1	%	80
D3-N-MeFOSAA (surr.)	1	%	75
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Ultra Trace			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.001	ug/L	< 0.001
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA) ^{N11}	0.005	ug/L	2.1
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.001	ug/L	< 0.001
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N11}	0.001	ug/L	< 0.001
13C2-4:2 FTSA (surr.)	1	%	47
13C2-6:2 FTSA (surr.)	1	%	64
13C2-8:2 FTSA (surr.)	1	%	122
13C2-10:2 FTSA (surr.)	1	%	140
PFASs Summations			
Sum (PFHxS + PFOS)*	0.001	ug/L	119
Sum of US EPA PFAS (PFOS + PFOA)*	0.001	ug/L	43.1
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.001	ug/L	123.1
Sum of WA DWER PFAS (n=10)*	0.005	ug/L	182.26
Sum of PFASs (n=30)*	0.005	ug/L	204.473

Sample History

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

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

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



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

ABN: 50 005 085 521

ABN: 91 05 0159 898

NZBN: 9429046024954

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554	Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
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Company Name:
Address:

Project Name:
Project ID:

GHD Pty Ltd SA
GPO Box 2052
Adelaide
SA 5001

12647854

Order No.:
Report #:
Phone:
Fax:

1148893
08 8111 6600
08 8111 6699

Received:
Due:
Priority:
Contact Name:

Oct 14, 2024 4:25 PM
Oct 21, 2024
5 Day
Terrance Wilson

Eurofins Analytical Services Manager : Karl Bulow

Sample Detail						- Per- and Polyfluoroalkyl Substances (PFASs) - Ultra Trace
Melbourne Laboratory - NATA # 1261 Site # 1254						X
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	FS01	Oct 09, 2024		Water	M24-Oc0033948	X
Test Counts						1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

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

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<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 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

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

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.005			0.005	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.001			0.001	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.001			0.001	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.001			0.001	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.001			0.001	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.001			0.001	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.001			0.001	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.001			0.001	Pass	
Method Blank							
Perfluoroalkyl sulfonic acids (PFSA)s- Ultra Trace							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.001			0.001	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.001			0.001	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.001			0.001	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.001			0.001	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.001			0.001	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.001			0.001	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.0001			0.0001	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.001			0.001	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances- Ultra Trace							
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	ug/L	< 0.005			0.005	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	ug/L	< 0.005			0.005	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.005			0.005	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.005			0.005	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.005			0.005	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.005			0.005	Pass	
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.005			0.005	Pass	
Method Blank							
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)s- Ultra Trace							
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	ug/L	< 0.005			0.005	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.001			0.001	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace							
Perfluorobutanoic acid (PFBA)	%	99			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	82			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	86			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	83			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	97			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	92			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	88			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	105			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	93			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	56			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	92			50-150	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)- Ultra Trace									
Perfluorobutanesulfonic acid (PFBS)			%	84			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)			%	90			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)			%	134			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)			%	92			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)			%	91			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)			%	102			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)			%	88			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)			%	69			50-150	Pass	
LCS - % Recovery									
Perfluoroalkyl sulfonamido substances- Ultra Trace									
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)			%	92			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)			%	97			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)			%	85			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)			%	108			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)			%	92			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)			%	98			50-150	Pass	
Perfluorooctane sulfonamide (FOSA)			%	98			50-150	Pass	
LCS - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Ultra Trace									
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	90			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)			%	98			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	98			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	107			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace									
				Result 1					
Perfluorobutanoic acid (PFBA)	S24-Oc0032572	NCP	%	100			50-150	Pass	
Perfluorodecanoic acid (PFDA)	S24-Oc0029565	NCP	%	89			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	S24-Oc0029565	NCP	%	94			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-Oc0040926	NCP	%	59			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M24-Oc0040926	NCP	%	89			50-150	Pass	
Perfluorononanoic acid (PFNA)	M24-Oc0040926	NCP	%	89			50-150	Pass	
Perfluorooctanoic acid (PFOA)	M24-Oc0040926	NCP	%	84			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	S24-Oc0032572	NCP	%	118			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S24-Oc0029565	NCP	%	108			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	S24-Oc0029565	NCP	%	56			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	S24-Oc0029565	NCP	%	91			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFASs)- Ultra Trace									
				Result 1					
Perfluorobutanesulfonic acid (PFBS)	M24-Oc0040926	NCP	%	92			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	M24-Oc0040926	NCP	%	79			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	M24-Oc0040926	NCP	%	98			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M24-Oc0040926	NCP	%	89			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M24-Oc0040926	NCP	%	82			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroheptanesulfonic acid (PFHpS)	M24-Oc0040926	NCP	%	92			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	S24-Oc0029565	NCP	%	93			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	S24-Oc0029565	NCP	%	56			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances- Ultra Trace				Result 1					
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	S24-Oc0029565	NCP	%	110			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	S24-Oc0029565	NCP	%	118			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	S24-Oc0029565	NCP	%	99			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S24-Oc0029565	NCP	%	113			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	S24-Oc0029565	NCP	%	93			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S24-Oc0029565	NCP	%	114			50-150	Pass	
Perfluorooctane sulfonamide (FOSA)	S24-Oc0029565	NCP	%	109			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)- Ultra Trace				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	S24-Oc0029565	NCP	%	98			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-Oc0040926	NCP	%	97			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M24-Oc0040926	NCP	%	96			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S24-Oc0029565	NCP	%	110			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs) - Ultra Trace				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M24-Oc0040925	NCP	ug/L	0.010	0.010	2.0	30%	Pass	
Perfluorodecanoic acid (PFDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorododecanoic acid (PFDoDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M24-Oc0040925	NCP	ug/L	0.002	0.002	1.0	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M24-Oc0040925	NCP	ug/L	0.011	0.011	2.0	30%	Pass	
Perfluorononanoic acid (PFNA)	M24-Oc0040925	NCP	ug/L	0.001	0.001	2.0	30%	Pass	
Perfluorooctanoic acid (PFOA)	M24-Oc0040925	NCP	ug/L	0.009	0.008	3.0	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M24-Oc0040925	NCP	ug/L	0.008	0.006	26	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S24-Oc0025611	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluorotridecanoic acid (PFTTrDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnDA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate								
Perfluoroalkyl sulfonic acids (PFASs)- Ultra Trace				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M24-Oc0040925	NCP	ug/L	0.005	0.005	4.0	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M24-Oc0040925	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M24-Oc0040925	NCP	ug/L	0.003	0.003	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M24-Oc0040925	NCP	ug/L	0.002	0.002	8.0	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M24-Oc0040925	NCP	ug/L	0.025	0.025	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M24-Oc0040925	NCP	ug/L	0.001	0.001	7.0	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	S24-Oc0029572	NCP	ug/L	< 0.0001	< 0.0001	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonamido substances- Ultra Trace				Result 1	Result 2	RPD		
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol(N-EtFOSE)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol(N-MeFOSE)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	S24-Oc0029572	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	S24-Oc0029572	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
Perfluorooctane sulfonamide (FOSA)	S24-Oc0025611	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)- Ultra Trace				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid(6:2 FTSA)	M24-Oc0040925	NCP	ug/L	< 0.005	< 0.005	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S24-Oc0029572	NCP	ug/L	< 0.001	< 0.001	<1	30%	Pass

Comments
Sample Integrity

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

Qualifier Codes/Comments

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

Authorised by:

Catherine Wilson	Analytical Services Manager
Joseph Edouard	Senior Analyst-PFAS



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please [click here](#).

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Appendix F

Tabulated Analytical Results



	Inorganics	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids										
	Moisture (%)	Perfluorobutane sulfonic acid (PFBS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorooheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluorooheptanoic acid (PFHpA)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctanoic acid (PFOA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTriDA)	Perfluoroundecanoic acid (PFUnDA)
EQL	%	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
PFAS NEMP 2.0 2020 Ecological direct exposure	0.1	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
PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites					1									10				
PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)					0.14 ^{#1}													
SA MFS Site Specific Criteria - Regional (Retained)					2		2							20				
														50				

Location Code	Date	Field ID	Depth	Lab Report Number																		
SS08	23 Sep 2024	SS08 0-0.1	0 - 0.1	EM2416721	3.1	0.0009	0.0104	0.0005	0.0766	0.0015	0.0156	<0.001	0.0004	0.0011	0.0003	0.0016	<0.0002	0.0009	0.0004	<0.0005	0.0002	0.0007
SS08	23 Sep 2024	SS08 0.2-0.3	0.2 - 0.3	EM2416721	4.0	0.0007	0.0049	0.0007	0.0646	0.0012	0.0176	<0.001	0.0002	0.0006	<0.0002	0.0007	<0.0002	0.0013	0.0004	<0.0005	<0.0002	0.0005
SS09	23 Sep 2024	SS09 0-0.1	0 - 0.1	EM2416721	0.9	<0.0002	<0.0002	<0.0002	0.0030	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
SS09	23 Sep 2024	SS09-0.2-0.3	0.2 - 0.3	EM2416721	1.8	<0.0002	<0.0002	<0.0002	0.0010	<0.0002	0.0003	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002
BH08	23 Sep 2024	BH08 0-0.2	0 - 0.2	EM2416721	3.7	0.0002	0.0059	0.0003	0.0654	0.0003	0.0048	<0.001	0.0002	<0.0002	<0.0002	0.0004	<0.0002	0.0003	<0.0005	<0.0002	0.0004	0.0004
BH08	23 Sep 2024	BH08 0.5	0.5	EM2416721	3.8	<0.0002	0.0004	0.0007	0.121	0.0002	0.0076	<0.001	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0005	<0.0002	<0.0005	<0.0002	<0.0002
BH08	23 Sep 2024	BH08 1.5	1.5	EM2416721	14.6	0.0004	<0.0002	<0.0002	0.0070	0.0004	0.0010	<0.001	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	0.0003	<0.0005	<0.0002	<0.0002
BH09	23 Sep 2024	BH09 0-0.2	0 - 0.2	EM2416721	24.8	<0.0002	0.0020	<0.0002	0.0132	<0.0002	0.0013	<0.001	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	0.0003	<0.0002	<0.0005	<0.0002	0.0003
BH09	23 Sep 2024	BH09 0.5	0.5	EM2416721	3.5	<0.0002	0.0004	<0.0002	0.0132	0.0004	0.0059	<0.001	<0.0002	<0.0002	0.0003	0.0007	<0.0002	0.0002	0.0002	<0.0005	<0.0002	<0.0002
BH09	23 Sep 2024	BH09 1.5	1.5	EM2416721	3.6	<0.0002	<0.0002	0.0033	0.203	<0.0002	0.0024	<0.001	<0.0002	<0.0002	<0.0002	0.0002	0.0007	0.0011	<0.0002	<0.0005	<0.0002	<0.0002
BH10	24 Sep 2024	BH10 0-0.2	0 - 0.2	EM2416721	7.4	0.0023	<0.0002	0.0003	0.0607	0.0012	0.0036	0.002	<0.0002	<0.0002	<0.0002	0.0065	<0.0002	0.0004	0.0024	<0.0005	<0.0002	<0.0002
BH10	24 Sep 2024	BH10 0.5	0.5	EM2416721	6.5	0.0014	<0.0002	0.0006	0.0034	0.0013	0.0154	0.002	<0.0002	<0.0002	<0.0002	0.0004	0.0044	<0.0002	0.0011	0.0016	<0.0005	<0.0002
BH10	24 Sep 2024	BH10 1.5	1.5	EM2416721	10.4	0.0017	<0.0002	<0.0002	0.0008	0.0012	0.0057	<0.001	<0.0002	<0.0002	<0.0002	0.0041	<0.0002	0.0002	0.0008	<0.0005	<0.0002	<0.0002
BH11	24 Sep 2024	BH11 0-0.2	0 - 0.2	EM2416721	6.7	0.0165	<0.0002	0.0003	0.0088	0.0096	0.0178	0.004	<0.0002	<0.0002	0.0012	0.0497	<0.0002	0.0005	0.0092	<0.0005	<0.0002	<0.0002
BH11	24 Sep 2024	BH11 0.5	0.5	EM2416721	10.6	0.0144	<0.0002	0.0118	0.0079	0.0236	0.283	0.002	<0.0002	<0.0002	0.0057	0.0605	<0.0002	0.0214	0.0062	<0.0005	<0.0002	<0.0002
BH11	24 Sep 2024	BH11 1.5	1.5	EM2416721	10.9	0.0026	<0.0002	0.0033	0.0520	0.0068	0.0625	<0.001	<0.0002	<0.0002	0.0013	0.0122	<0.0002	0.0034	0.0009	<0.0005	<0.0002	<0.0002
BH12	24 Sep 2024	BH12 0.4-0.5	0.4 - 0.5	EM2416721	7.6	0.0004	<0.0002	0.0008	0.0116	0.0008	0.0137	<0.001	<0.0002	<0.0002	0.0005	0.0011	<0.0002	0.0014	0.0006	<0.0005	<0.0002	<0.0002
BH12	24 Sep 2024	BH12 1.0	1	EM2416721	9.7	0.0005	<0.0002	<0.0002	0.0007	0.0007	0.0028	<0.001	<0.0002	<0.0002	0.0002	0.0017	<0.0002	<0.0002	0.0005	<0.0005	<0.0002	<0.0002
MW04	23 Sep 2024	MW04 0-0.2	0 - 0.2	EM2416721	2.4	0.0002	<0.0002	<0.0002	0.0083	0.0002	0.0022	<0.001	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002
MW04	23 Sep 2024	MW04 3.0	3	EM2416721	18.2	0.0043	<0.0002	0.0008	0.0129	0.0043	0.0249	<0.001	<0.0002	<0.0002	0.0007	0.0076	<0.0002	0.0012	0.0015	<0.0005	<0.0002	<0.0002
MW05	23 Sep 2024	MW05 0-0.2	0 - 0.2	EM2416721	1.7	<0.0002	<0.0002	<0.0002	0.0020	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002
MW05	23 Sep 2024	MW05 7.0	7	EM2416721	17.2	<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	<0.0005	<0.0002	<0.0002	<0.0002
MW06	24 Sep 2024	MW06 0-0.2	0 - 0.2	EM2416721	5.5	<0.0002	<0.0002	<0.0002	0.0011	<0.0002	0.0011	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.0005	<0.0002	<0.0002
MW06	24 Sep 2024	MW06 3.0	3	EM2416721	19.6	<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	<0.0005	<0.0002	<0.0002	<0.0002

Statistics																					
Number of Results	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Number of Detects	24	14	6	12	22	16	20	4	3	2	9	18	1	16	13	0	1	4			
Minimum Concentration	0.9	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	<0.0005	0.0002	<0.0002	<0.0005	0.0002	<0.0002
Minimum Detect	0.9	0.0002	0.0004	0.0003	0.0007	0.0002	0.0003	0.002	0.0002	0.0006	0.0002	0.0002	0.0007	0.0002	0.0002	ND	0.0002	0.0003			
Maximum Concentration	24.8	0.0165	0.0104	0.0118	0.203	0.0236	0.283	0.004	0.0004	0.0011	0.0057	0.0605	0.0007	0.0214	0.0092	<0.0005	0.0002	0.0007			
Maximum Detect	24.8	0.0165	0.0104	0.0118	0.203	0.0236	0.283	0.004	0.0004	0.0011	0.0057	0.0605	0.0007	0.0214	0.0092	ND	0.0002	0.0007			
Average Concentration *	8.3	0.002	0.0011	0.001	0.031	0.0023	0.02	0.00083	0.00012	0.00016	0.0005	0.0064	0.00012	0.0015	0.0011	0.00025	0.0001	0.00016			
Geometric Average *	6	0.00044	0.00022	0.0003	0.0072	0.00053	0.0032	0.00065	0.00011	0.00012	0.0002	0.00087	0.00011	0.00041	0.00034	0.00025	0.0001	0.00013			
Median Concentration *	6.6	0.0003	0.0001	0.0002	0.00855	0.0004	0.0042	0.0005	0.0001	0.0001	0.0001	0.00055	0.0001	0.00035	0.00025	0.00025	0.0001	0.0001			
Standard Deviation *	6.5	0.0043	0.0025	0.0025	0.049	0.0051	0.058	0.00084	0.000066	0.00022	0.0012	0.015	0.00012	0.0043	0.0022	0	0.00002	0.00016			
Geometric Standard Deviation *	2.4	5.3	4.5	4	8.2	5.2	8.5	1.8	1.4	1.8	3	7.3	1.5	4	4.2	1	1.2	1.8			
95% UCL (Student's-t) *	10.52	0.00348	0.00195	0.00189	0.0478	0.00406	0.0405	0.00113	0.00014385	0.00024094	0.00090894	0.0118	0.00016785	0.003	0.00185	0.00025	0.00011131	0.00021691			
% of Detects	100	58	25	50	92	67	83	17	12	8	38	75	4	67	54	0	4	17			
% of Non-Detects	0	42	75	50	8	33	17	83	88	92	62	25	96	33	46	100	96	83			

* A Non Detect Multiplier of 0.5 has been applied.

Comments

#1 This is the higher criterion for (the existing ecological indirect exposure) intensely developed sites with no secondary consumers and minimal potential for indirect ecological exposure. For indicative purposes only.
#2 If the concentration of PFHxS > PFOS this guideline value needs to be adjusted accordingly. Please refer to Section 8.5.2.1 of the PFAS NEMP 2.0 guideline for further information

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 sites
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)
28/06/2023, SA MFS Site Specific Criteria - Regional (Retained)



	PFAS - Perfluoroalkyl Sulfonamide							PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums		
	N-Ethyl perfluorooctane sulfonamide (EFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EFOSE)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	Perfluorooctane sulfonamide (FOSA)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)	Sum of PFHxS and PFOS
	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	0.0005	0.0002	0.0005	0.0005	0.0002	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														
PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)														2 ^{#2}
SA MFS Site Specific Criteria - Regional (Retained)														40

Location Code	Date	Field ID	Depth	Lab Report Number														
SS08	23 Sep 2024	SS08 0-0.1	0 - 0.1	EM2416721	<0.0005	0.0009	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.112	0.0963	0.0922
SS08	23 Sep 2024	SS08 0.2-0.3	0.2 - 0.3	EM2416721	<0.0005	0.0040	<0.0005	<0.0005	<0.0002	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0976	0.0853	0.0822
SS09	23 Sep 2024	SS09 0-0.1	0 - 0.1	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0030	0.0030	0.0030
SS09	23 Sep 2024	SS09-0.2-0.3	0.2 - 0.3	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0013	0.0013
BH08	23 Sep 2024	BH08 0-0.2	0 - 0.2	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0782	0.0711	0.0702
BH08	23 Sep 2024	BH08 0.5	0.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.131	0.129	0.129
BH08	23 Sep 2024	BH08 1.5	1.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0095	0.0091	0.0080
BH09	23 Sep 2024	BH09 0-0.2	0 - 0.2	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0175	0.0152	0.0145
BH09	23 Sep 2024	BH09 0.5	0.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0213	0.0205	0.0191
BH09	23 Sep 2024	BH09 1.5	1.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.211	0.207	0.205
BH10	24 Sep 2024	BH10 0-0.2	0 - 0.2	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0794	0.0779	0.0643
BH10	24 Sep 2024	BH10 0.5	0.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0316	0.0297	0.0188
BH10	24 Sep 2024	BH10 1.5	1.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0145	0.0133	0.0065
BH11	24 Sep 2024	BH11 0-0.2	0 - 0.2	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.118	0.108	0.0266
BH11	24 Sep 2024	BH11 0.5	0.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.436	0.401	0.291
BH11	24 Sep 2024	BH11 1.5	1.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.145	0.135	0.114
BH12	24 Sep 2024	BH12 0.4-0.5	0.4 - 0.5	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0309	0.0293	0.0253
BH12	24 Sep 2024	BH12 1.0	1	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0071	0.0064	0.0035
MW04	23 Sep 2024	MW04 0-0.2	0 - 0.2	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0112	0.0110	0.0105
MW04	23 Sep 2024	MW04 3.0	3	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0582	0.0531	0.0378
MW05	23 Sep 2024	MW05 0-0.2	0 - 0.2	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0020	0.0020	0.0020
MW05	23 Sep 2024	MW05 7.0	7	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002
MW06	24 Sep 2024	MW06 0-0.2	0 - 0.2	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.0030	0.0030	0.0022
MW06	24 Sep 2024	MW06 3.0	3	EM2416721	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002

Statistics																	
Number of Results	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Number of Detects	0	2	0	0	0	0	0	1	0	0	0	22	22	22	22	22	22
Minimum Concentration	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Minimum Detect	ND	0.0009	ND	ND	ND	ND	0.0002	ND	ND	ND	ND	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
Maximum Concentration	<0.0005	0.004	<0.0005	<0.0005	<0.0002	<0.0005	0.0002	<0.0005	<0.0005	<0.0005	<0.0005	0.436	0.401	0.291	0.436	0.401	0.291
Maximum Detect	ND	0.004	ND	ND	ND	ND	0.0002	ND	ND	ND	ND	0.436	0.401	0.291	0.436	0.401	0.291
Average Concentration *	0.00025	0.0003	0.00025	0.00025	0.0001	0.00025	0.0001	0.00025	0.0001	0.00025	0.00025	0.00025	0.00025	0.00025	0.067	0.063	0.051
Geometric Average *	0.00025	0.00013	0.00025	0.00025	0.0001	0.00025	0.0001	0.00025	0.0001	0.00025	0.00025	0.00025	0.00025	0.00025	0.018	0.017	0.013
Median Concentration *	0.00025	0.0001	0.00025	0.00025	0.0001	0.00025	0.0001	0.00025	0.0001	0.00025	0.00025	0.00025	0.00025	0.00025	0.0261	0.0249	0.01895
Standard Deviation *	0	0.00081	0	0	0	0	0.00002	0	0	0	0	0.097	0.091	0.073	0.097	0.091	0.073
Geometric Standard Deviation *	1	2.4	1	1	1	1	1.2	1	1	1	1	9.3	9	8.6	9.3	9	8.6
95% UCL (Student's-t) *	0.00025	0.00057769	0.00025	0.00025	0.0001	0.00025	0.00011131	0.00025	0.00025	0.00025	0.00025	0.102	0.0945	0.0766	0.102	0.0945	0.0766
% of Detects	0	8	0	0	0	0	4	0	0	0	0	92	92	92	92	92	92
% of Non-Detects	100	92	100	100	100	100	96	100	100	100	100	8	8	8	8	8	8

* A Non Detect Multiplier of 0.5 has been applied.

Comments

#1 This is the higher criterion for (the existing ecological indirect exposure) intensely developed sites with no secondary consumers and minimal potential for indirect ecological exposure. For indicative purposes only.
#2 If the concentration of PFHxS > PFOS this guideline value needs to be adjusted accordingly. Please refer to Section 8.5.2.1 of the PFAS NEMP 2.0 guideline for further information

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 sites
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)
28/06/2023, SA MFS Site Specific Criteria - Regional (Retained)



	Acidity & Alkalinity				Major Ions									Nutri	
	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Chloride	Sulfate (filtered)	Cations Total	Anions Total	Ionic Balance	Ammonia as N	Nitrate (as N)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L
EQL	1	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system															
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system															
PFAS NEMP 2.0 2020 Recreational Water															

Location Code	Date	Field ID	Lab Report Number															
MW01	08 Oct 2024	MW01	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	08 Oct 2024	MW02	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	08 Oct 2024	MW03	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04	09 Oct 2024	MW04	EM2417600	<1	2,050	<1	2,050	136	450	313	6,170	8,830	1,400	320	319	0.16	2.73	10.1
MW05	09 Oct 2024	MW05	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	09 Oct 2024	MW06	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics																		
Number of Results	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Number of Detects	0	4	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Minimum Concentration	<1	54	<1	54	15	12	4	86	113	46	5.63	5.24	0.16	0.65	0.24			
Minimum Detect	ND	54	ND	54	15	12	4	86	113	46	5.63	5.24	0.16	0.65	0.24			
Maximum Concentration	<1	2,050	<1	2,050	136	450	313	6,170	8,830	1,400	320	319	3.89	2.73	10.1			
Maximum Detect	ND	2,050	ND	2,050	136	450	313	6,170	8,830	1,400	320	319	3.89	2.73	10.1			
Average Concentration *	0.5	555	0.5	555	46	122	82	1,608	2,293	386	84	84	2.2	1.2	2.7			
Geometric Average *	0.5	139	0.5	139	27	30	13	252	339	113	16	15	1.3	0.94	0.65			
Median Concentration *	0.5	58	0.5	58	16.5	12	5	87.5	115	50	5.72	5.43	2.415	0.67	0.27			
Standard Deviation *	0	997	0	997	60	219	154	3,042	4,358	676	157	157	1.8	1	4.9			
Geometric Standard Deviation *	1	6	1	6	2.9	6.1	8.2	8.4	8.8	5.4	7.5	7.7	4.4	2	6.3			
95% UCL (Student's-t) *	0.5	1,728	0.5	1,728	116.6	379.2	263.2	5,187	7,421	1,182	269.2	268.3	4.329	2.396	8.509			
% of Detects	0	100	0	100	100	100	100	100	100	100	100	100	100	100	100			
% of Non-Detects	100	0	100	0	0	0	0	0	0	0	0	0	0	0	0			

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	ents			Metals											
	Alkalinity (Carbonate as CaCO3)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)	Arsenic	Arsenic (filtered)	Cadmium	Cadmium (filtered)	Chromium (II+VI)	Chromium (II+VI) (filtered)	Copper	Copper (filtered)	Lead	Lead (filtered)	Mercury	Mercury (filtered)
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL	1	0.01	0.01	0.001	0.001	0.0001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.0001	0.0001
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system															
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system															
PFAS NEMP 2.0 2020 Recreational Water															

Location Code	Date	Field ID	Lab Report Number															
MW01	08 Oct 2024	MW01	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW02	08 Oct 2024	MW02	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	08 Oct 2024	MW03	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04	09 Oct 2024	MW04	EM2417600	<1	0.20	10.3	0.063	0.008	0.0001	<0.0001	0.061	0.010	0.053	0.023	0.022	0.011	<0.0001	<0.0001
MW05	09 Oct 2024	MW05	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	09 Oct 2024	MW06	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics																		
Number of Results	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Number of Detects	0	4	4	2	1	2	0	2	1	4	4	3	2	0	0			
Minimum Concentration	<1	0.05	0.29	0.001	<0.001	0.0001	<0.0001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.0001	<0.0001			
Minimum Detect	ND	0.05	0.29	0.001	0.008	0.0001	ND	0.002	0.01	0.001	0.001	0.002	0.002	ND	ND			
Maximum Concentration	<1	0.2	10.3	0.063	0.008	0.0001	<0.0001	0.061	0.01	0.053	0.023	0.022	0.011	<0.0001	<0.0001			
Maximum Detect	ND	0.2	10.3	0.063	0.008	0.0001	ND	0.061	0.01	0.053	0.023	0.022	0.011	ND	ND			
Average Concentration *	0.5	0.09	2.8	0.016	0.0024	0.000075	0.00005	0.016	0.0029	0.016	0.0078	0.0069	0.0035	0.00005	0.00005			
Geometric Average *	0.5	0.074	0.75	0.002	0.001	0.000071	0.00005	0.0024	0.0011	0.0053	0.0039	0.0029	0.0015	0.00005	0.00005			
Median Concentration *	0.5	0.055	0.325	0.00075	0.0005	0.000075	0.00005	0.00125	0.0005	0.004	0.0035	0.0025	0.00125	0.00005	0.00005			
Standard Deviation *	0	0.073	5	0.031	0.0038	0.000029	0	0.03	0.0048	0.025	0.01	0.01	0.005	0	0			
Geometric Standard Deviation *	1	2	5.8	10	4	1.5	1	9.7	4.5	5.3	3.9	4.8	4.3	1	1			
95% UCL (Student's-t) *	0.5	0.176	8.686	0.0529	0.00679	0.00010897	0.00005	0.0513	0.00846	0.045	0.0199	0.0188	0.00944	0.00005	0.00005			
% of Detects	0	100	100	50	25	50	0	50	25	100	100	75	50	0	0			
% of Non-Detects	100	0	0	50	75	50	100	50	75	0	0	25	50	100	100			

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	Alkalinity (Carbonate as CaCO3)	Nickel	Nickel (filtered)	Zinc	Zinc (filtered)	PFAS - Perfluoroalkyl Sulfonic Acids						Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluoroheptanoic acid (PFHpA)
						Perfluorobutane sulfonic acid (PFBS)	Perfluorodecanesulfonic acid (PFDS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)				
EQL	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	1	0.001	0.001	0.005	0.005	0.0005	0.0005	0.0005	0.0002	0.0005	0.0005	0.002	0.0005	0.0005	0.0005
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system									0.13						
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system									0.00023						
PFAS NEMP 2.0 2020 Recreational Water									2		2				

Location Code	Date	Field ID	Lab Report Number															
MW01	08 Oct 2024	MW01	EM2417600	-	-	-	-	-	0.215	<0.0005	0.0778	1.73	0.180	0.414	0.0800	<0.0005	<0.0005	0.0618
MW02	08 Oct 2024	MW02	EM2417600	-	-	-	-	-	3.17	<0.0005	0.125	0.545	1.87	6.38	1.03	<0.0005	<0.0005	0.266
MW03	08 Oct 2024	MW03	EM2417600	-	-	-	-	-	1.63	<0.0005	0.0996	0.380	1.13	3.60	0.396	<0.0005	<0.0005	0.107
MW04	09 Oct 2024	MW04	EM2417600	<1	0.041	0.018	0.094	0.037	13.5	<0.0005	2.82	36.4	13.9	73.7	3.77	<0.0005	<0.0005	3.20
MW05	09 Oct 2024	MW05	EM2417600	-	-	-	-	-	<0.0005	<0.0005	0.0012	0.0256	0.0050	0.0186	<0.0020	<0.0005	<0.0005	<0.0005
MW06	09 Oct 2024	MW06	EM2417600	-	-	-	-	-	0.0240	<0.0005	0.0030	0.0372	0.0114	0.0619	<0.0020	<0.0005	<0.0005	0.0041

Statistics

Number of Results	4	4	4	4	4	10	10	10	10	10	10	10	10	10	10	10	10
Number of Detects	0	3	2	4	4	7	0	7	10	7	9	4	1	0	6		
Minimum Concentration	<1	0.001	0.001	0.008	0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005		
Minimum Detect	ND	0.001	0.001	0.008	0.01	0.0007	ND	0.0012	0.0008	0.0026	0.0026	0.08	0.0007	ND	0.0018		
Maximum Concentration	<1	0.041	0.018	0.094	0.037	13.5	<0.0005	2.82	36.4	13.9	73.7	3.77	0.0007	<0.0005	3.2		
Maximum Detect	ND	0.041	0.018	0.094	0.037	13.5	ND	2.82	36.4	13.9	73.7	3.77	0.0007	ND	3.2		
Average Concentration *	0.5	0.011	0.005	0.045	0.025	1.9	0.00025	0.31	3.9	1.7	8.4	0.53	0.0003	0.00025	0.36		
Geometric Average *	0.5	0.0025	0.0015	0.032	0.022	0.021	0.00025	0.007	0.093	0.02	0.096	0.013	0.00028	0.00025	0.0066		
Median Concentration *	0.5	0.0015	0.00075	0.0385	0.0265	0.01425	0.00025	0.00245	0.0432	0.0082	0.04435	0.001	0.00025	0.00025	0.00295		
Standard Deviation *	0	0.02	0.0087	0.036	0.012	4.2	0	0.88	11	4.3	23	1.2	0.00014	0	1		
Geometric Standard Deviation *	1	7	5.5	2.8	1.8	72	1	26	22	58	51	31	1.4	1	33		
95% UCL (Student's-t) *	0.5	0.0346	0.0152	0.087	0.0388	4.303	0.00025	0.824	10.54	4.22	21.78	1.215	0.00037749	0.00025	0.944		
% of Detects	0	75	50	100	100	70	0	70	100	70	90	40	10	0	60		
% of Non-Detects	100	25	50	0	0	30	100	30	0	30	10	60	90	100	40		

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	PFAS - Perfluoroalkyl Carboxylic Acids								PFAS - Perfluoroalkyl Sulfonamide						
	Alkalinity (Carbonate as CaCO3)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctanoic acid (PFOA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTiDA)	Perfluoroundecanoic acid (PFUnDA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	Perfluorooctane sulfonamide (FOSA)
	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.001	0.0005	0.001	0.001	0.0005	0.001	0.0005
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system				220											
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system				19											
PFAS NEMP 2.0 2020 Recreational Water				10											

Location Code	Date	Field ID	Lab Report Number														
MW01	08 Oct 2024	MW01	EM2417600	-	0.378	<0.0016 ^{#2}	0.0221	0.119	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	0.0030
MW02	08 Oct 2024	MW02	EM2417600	-	5.33	0.0030	0.200	1.81	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.0005
MW03	08 Oct 2024	MW03	EM2417600	-	2.03	<0.0016 ^{#2}	0.115	0.620	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.0005
MW04	09 Oct 2024	MW04	EM2417600	<1	31.1	0.0377	4.66	7.04	<0.0008 ^{#2}	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	0.0097
MW05	09 Oct 2024	MW05	EM2417600	-	0.0044	<0.0005	0.0010	0.0008	<0.0008 ^{#2}	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.0005
MW06	09 Oct 2024	MW06	EM2417600	-	0.0196	<0.0005	0.0088	0.0068	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.0005

Statistics																
Number of Results	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Number of Detects	0	9	2	9	7	0	0	0	0	0	0	0	0	0	0	2
Minimum Concentration	<1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.0005
Minimum Detect	ND	0.0012	0.003	0.0006	0.0008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.003
Maximum Concentration	<1	31.1	0.0377	4.66	7.04	<0.0008	<0.0005	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.0005	0.0097
Maximum Detect	ND	31.1	0.0377	4.66	7.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0097
Average Concentration *	0.5	3.9	0.0044	0.5	0.96	0.0003	0.00025	0.00025	0.0005	0.00025	0.0005	0.0005	0.0005	0.00025	0.0005	0.0015
Geometric Average *	0.5	0.049	0.00067	0.0095	0.013	0.00029	0.00025	0.00025	0.0005	0.00025	0.0005	0.0005	0.0005	0.00025	0.0005	0.00046
Median Concentration *	0.5	0.0171	0.00025	0.00595	0.00455	0.00025	0.00025	0.00025	0.0005	0.00025	0.0005	0.0005	0.0005	0.00025	0.0005	0.00025
Standard Deviation *	0	9.7	0.012	1.5	2.2	0.000072	0	0	0	0	0	0	0	0	0	0.003
Geometric Standard Deviation *	1	53	5.2	23	53	1.3	1	1	1	1	1	1	1	1	1	3.8
95% UCL (Student's-t) *	0.5	9.517	0.0112	1.349	2.242	0.000337	0.00025	0.00025	0.0005	0.00025	0.0005	0.0005	0.0005	0.00025	0.0005	0.00322
% of Detects	0	90	20	90	70	0	0	0	0	0	0	0	0	0	0	20
% of Non-Detects	100	10	80	10	30	100	100	100	100	100	100	100	100	100	100	80

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	PFAS - Fluorotelomer Sulfonic Acids					PFAS - Sums			PFAS TOPA - Perfluoroalkyl Carboxylic Ac						
	Alkalinity (Carbonate as CaCO3)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)	Sum of PFHxS and PFOS	PFBA (TOPA)	PFPeA (TOPA)	PFHxA (TOPA)	PFHpA (TOPA)	PFOA (TOPA)	PFNA (TOPA)	PFDA (TOPA)
	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	0.001	0.001	0.001	0.001	0.0002	0.0002	0.0002	0.01	0.002	0.002	0.002	0.002	0.002	0.002
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system													220 ^{#1}		
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system													19 ^{#1}		
PFAS NEMP 2.0 2020 Recreational Water								2					10 ^{#1}		

Location Code	Date	Field ID	Lab Report Number															
MW01	08 Oct 2024	MW01	EM2417600	-	<0.001	<0.001	0.001	<0.001	3.37	3.02	2.14	0.20	0.164	0.495	0.061	0.028	<0.002	<0.002
MW02	08 Oct 2024	MW02	EM2417600	-	<0.001	<0.001	0.008	<0.001	22.4	18.7	6.92	-	-	-	-	-	-	-
MW03	08 Oct 2024	MW03	EM2417600	-	<0.001	<0.001	<0.001	<0.001	11.0	8.88	3.98	-	-	-	-	-	-	-
MW04	09 Oct 2024	MW04	EM2417600	<1	<0.001	<0.001	1.80	<0.001	198	175	110	15.4	14.8	52.8	3.45	4.83	0.041	<0.002
MW05	09 Oct 2024	MW05	EM2417600	-	<0.001	<0.001	<0.001	<0.001	0.0590	0.0504	0.0442	-	-	-	-	-	-	-
MW06	09 Oct 2024	MW06	EM2417600	-	<0.001	<0.001	0.002	<0.001	0.184	0.164	0.0991	-	-	-	-	-	-	-

Statistics																	
Number of Results	4	10	10	10	10	10	10	10	10	2	2	2	2	2	2	2	
Number of Detects	0	0	0	7	1	10	10	10	10	2	2	2	2	2	1	0	
Minimum Concentration	<1	<0.001	<0.001	0.001	<0.001	0.0028	0.0028	0.0008	0.2	0.164	0.495	0.061	0.028	<0.002	<0.002		
Minimum Detect	ND	ND	ND	0.001	0.002	0.0028	0.0028	0.0008	0.2	0.164	0.495	0.061	0.028	0.041	ND		
Maximum Concentration	<1	<0.001	<0.001	1.8	0.002	198	175	110	15.4	14.8	52.8	3.45	4.83	0.041	<0.002		
Maximum Detect	ND	ND	ND	1.8	0.002	198	175	110	15.4	14.8	52.8	3.45	4.83	0.041	ND		
Average Concentration *	0.5	0.0005	0.0005	0.18	0.00065	24	21	12	7.8	7.5	27	1.8	2.4	0.021	0.001		
Geometric Average *	0.5	0.0005	0.0005	0.0031	0.00057	0.42	0.38	0.22	1.8	1.6	5.1	0.46	0.37	0.0064	0.001		
Median Concentration *	0.5	0.0005	0.0005	0.0015	0.0005	0.153	0.1405	0.08755	7.8	7.482	26.6475	1.7555	2.429	0.021	0.001		
Standard Deviation *	0	0	0	0.57	0.00047	62	55	34	11	10	37	2.4	3.4	0.028	0		
Geometric Standard Deviation *	1	1	1	12	1.6	39	37	36	22	24	27	17	38	14	1		
95% UCL (Student's-t) *	0.5	0.0005	0.0005	0.512	0.00092497	59.31	52.24	32.27	55.78	53.69	191.8	12.45	17.59	0.147	0.001		
% of Detects	0	0	0	70	10	100	100	100	100	100	100	100	100	100	50	0	
% of Non-Detects	100	100	100	30	90	0	0	0	0	0	0	0	0	0	50	100	

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	ds					PFAS TOPA - Perfluoroalkyl Sulfonic Acids						PFAS TOPA - Perfluoroalkyl			
	Alkalinity (Carbonate as CaCO3)	PFUnDA (TOPA)	PFDoDA (TOPA)	PFTtDA (TOPA)	PFTeDA (TOPA)	PFBS (TOPA)	PFPeS (TOPA)	PFHxS (TOPA)	PFHpS (TOPA)	PFOS (TOPA)	PFDS (TOPA)	FOSA (TOPA)	MeFOSA (TOPA)	EtFOSA (TOPA)	MeFOSAA (TOPA)
	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.005	0.002
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system										0.13 ^{#1}					
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system										0.00023 ^{#1}					
PFAS NEMP 2.0 2020 Recreational Water								2 ^{#1}		2 ^{#1}					

Location Code	Date	Field ID	Lab Report Number															
MW01	08 Oct 2024	MW01	EM2417600	-	<0.002	<0.002	<0.002	<0.005	0.211	0.164	0.416	0.078	1.45	<0.002	<0.002	<0.005	<0.005	<0.002
MW02	08 Oct 2024	MW02	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW03	08 Oct 2024	MW03	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW04	09 Oct 2024	MW04	EM2417600	<1	<0.002	<0.002	<0.002	<0.005	15.6	15.4	83.4	3.25	37.0	<0.002	0.016	<0.005	<0.005	<0.002
MW05	09 Oct 2024	MW05	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW06	09 Oct 2024	MW06	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics																		
Number of Results	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Number of Detects	0	0	0	0	0	2	2	2	2	2	2	0	1	0	0	0	0	0
Minimum Concentration	<1	<0.002	<0.002	<0.002	<0.005	0.211	0.164	0.416	0.078	1.45	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002
Minimum Detect	ND	ND	ND	ND	ND	0.211	0.164	0.416	0.078	1.45	ND	0.016	ND	ND	ND	ND	ND	ND
Maximum Concentration	<1	<0.002	<0.002	<0.002	<0.005	15.6	15.4	83.4	3.25	37	<0.002	0.016	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002
Maximum Detect	ND	ND	ND	ND	ND	15.6	15.4	83.4	3.25	37	ND	0.016	ND	ND	ND	ND	ND	ND
Average Concentration *	0.5	0.001	0.001	0.001	0.0025	7.9	7.8	42	1.7	19	0.001	0.0085	0.0025	0.0025	0.001	0.001	0.001	0.001
Geometric Average *	0.5	0.001	0.001	0.001	0.0025	1.8	1.6	5.9	0.5	7.3	0.001	0.004	0.0025	0.0025	0.001	0.001	0.001	0.001
Median Concentration *	0.5	0.001	0.001	0.001	0.0025	7.9055	7.782	41.908	1.664	19.225	0.001	0.0085	0.0025	0.0025	0.001	0.001	0.001	0.001
Standard Deviation *	0	0	0	0	0	11	11	59	2.2	25	0	0.011	0	0	0	0	0	0
Geometric Standard Deviation *	1	1	1	1	1	21	25	42	14	9.9	1	7.1	1	1	1	1	1	1
95% UCL (Student's-t) *	0.5	0.001	0.001	0.001	0.0025	56.49	55.88	303.9	11.68	131.5	0.001	0.0559	0.0025	0.0025	0.001	0.001	0.001	0.001
% of Detects	0	0	0	0	0	100	100	100	100	100	0	50	0	0	0	0	0	0
% of Non-Detects	100	100	100	100	100	0	0	0	0	0	100	50	100	100	100	100	100	100

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	1 Sulfonamide				PFAS TOPA - Fluorotelomer Sulfonic Acids				PFAS TOPA - Sums			
	Alkalinity (Carbonate as CaCO3)	MeFOSE (TOPA)	EFOSE (TOPA)	EfOSAA (TOPA)	4:2 FTS (TOPA)	6:2 FTS (TOPA)	8:2 FTS (TOPA)	10:2 FTS (TOPA)	Sum of TOP C4 - C14 as Fluorine (TOPA)	Sum of PFHxS and PFOS (TOPA)	Sum of PFAS	Sum of TOP C4 - C14 Carboxylates and C4 - C8 Sulfo_
	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	0.005	0.005	0.002	0.005	0.005	0.005	0.005	0.002	0.002	0.002	0.002
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system												
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system												
PFAS NEMP 2.0 2020 Recreational Water										2 ^{#1}		

Location Code	Date	Field ID	Lab Report Number												
MW01	08 Oct 2024	MW01	EM2417600	-	<0.005	<0.005	<0.002	<0.005	0.006	<0.005	<0.005	2.08	1.87	3.38	3.27
MW02	08 Oct 2024	MW02	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-
MW03	08 Oct 2024	MW03	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-
MW04	09 Oct 2024	MW04	EM2417600	<1	<0.005	<0.005	<0.002	<0.005	0.045	<0.005	<0.005	156	120	254	246
MW05	09 Oct 2024	MW05	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-
MW06	09 Oct 2024	MW06	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-

Statistics															
Number of Results	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Number of Detects	0	0	0	0	0	2	0	0	2	0	2	2	2	2	2
Minimum Concentration	<1	<0.005	<0.005	<0.002	<0.005	0.006	<0.005	<0.005	2.08	1.87	3.38	3.27			
Minimum Detect	ND	ND	ND	ND	ND	0.006	ND	ND	2.08	1.87	3.38	3.27			
Maximum Concentration	<1	<0.005	<0.005	<0.002	<0.005	0.045	<0.005	<0.005	156	120	254	246			
Maximum Detect	ND	ND	ND	ND	ND	0.045	ND	ND	156	120	254	246			
Average Concentration *	0.5	0.0025	0.0025	0.001	0.0025	0.026	0.0025	0.0025	79	61	129	125			
Geometric Average *	0.5	0.0025	0.0025	0.001	0.0025	0.016	0.0025	0.0025	18	15	29	28			
Median Concentration *	0.5	0.0025	0.0025	0.001	0.0025	0.0255	0.0025	0.0025	79.04	60.935	128.69	124.635			
Standard Deviation *	0	0	0	0	0	0.028	0	0	109	84	177	172			
Geometric Standard Deviation *	1	1	1	1	1	4.2	1	1	21	19	21	21			
95% UCL (Student's-t) *	0.5	0.0025	0.0025	0.001	0.0025	0.149	0.0025	0.0025	564.9	433.9	919.9	890.9			
% of Detects	0	0	0	0	0	100	0	0	100	100	100	100			
% of Non-Detects	100	100	100	100	100	0	100	100	0	0	0	0			

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	Acidity & Alkalinity				Major Ions									Nutrients			
	Alkalinity (Carbonate as CaCO3)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Calcium (filtered)	Magnesium (filtered)	Potassium (filtered)	Sodium (filtered)	Chloride	Sulfate (filtered)	Cations Total	Anions Total	Ionic Balance	Ammonia as N	Nitrate (as N)	Nitrite (as N)	Nitrogen (Total Oxidised) (as N)
EQL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system	1	1	1	1	1	1	1	1	1	1	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system																	
PFAS NEMP 2.0 2020 Recreational Water																	

Date	Field ID	Lab Report Number																	
09 Oct 2024	SW01	EM2417600	<1	54	<1	54	15	12	5	88	113	48	5.69	5.26	3.89	0.65	0.24	0.05	0.29
09 Oct 2024	SW02	EM2417600	<1	55	<1	55	16	12	4	86	113	46	5.63	5.24	3.54	0.68	0.25	0.05	0.30
09 Oct 2024	SW03	EM2417600	<1	61	<1	61	17	12	5	87	117	52	5.75	5.60	1.29	0.66	0.29	0.06	0.35
09 Oct 2024	SW_HYDRANT	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics

Number of Results	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Number of Detects	0	4	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Minimum Concentration	<1	54	<1	54	15	12	4	86	113	46	5.63	5.24	0.16	0.65	0.24	0.05	0.29
Minimum Detect	ND	54	ND	54	15	12	4	86	113	46	5.63	5.24	0.16	0.65	0.24	0.05	0.29
Maximum Concentration	<1	2,050	<1	2,050	136	450	313	6,170	8,830	1,400	320	319	3.89	2.73	10.1	0.2	10.3
Maximum Detect	ND	2,050	ND	2,050	136	450	313	6,170	8,830	1,400	320	319	3.89	2.73	10.1	0.2	10.3
Average Concentration *	0.5	555	0.5	555	46	122	82	1,608	2,293	386	84	84	2.2	1.2	2.7	0.09	2.8
Geometric Average *	0.5	139	0.5	139	27	30	13	252	339	113	16	15	1.3	0.94	0.65	0.074	0.75
Median Concentration *	0.5	58	0.5	58	16.5	12	5	87.5	115	50	5.72	5.43	2.415	0.67	0.27	0.055	0.325
Standard Deviation *	0	997	0	997	60	219	154	3,042	4,358	676	157	157	1.8	1	4.9	0.073	5
Geometric Standard Deviation *	1	6	1	6	2.9	6.1	8.2	8.4	8.8	5.4	7.5	7.7	4.4	2	6.3	2	5.8
95% UCL (Student's-t) *	0.5	1,728	0.5	1,728	116.6	379.2	263.2	5,187	7,421	1,182	269.2	268.3	4.329	2.396	8.509	0.176	8.686
% of Detects	0	100	0	100	100	100	100	100	100	100	100	100	100	100	100	100	100
% of Non-Detects	100	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	Alkalinity (Carbonate as CaCO3)	Metals															
		Arsenic	Arsenic (filtered)	Cadmium	Cadmium (filtered)	Chromium (III+VI)	Chromium (III+VI) (filtered)	Copper	Copper (filtered)	Lead	Lead (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Zinc	Zinc (filtered)
EQL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	1	0.001	0.001	0.0001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.0001	0.0001	0.001	0.001	0.005	0.005
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system																	
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system																	
PFAS NEMP 2.0 2020 Recreational Water																	

Date	Field ID	Lab Report Number																	
09 Oct 2024	SW01	EM2417600	<1	0.001	<0.001	<0.0001	<0.0001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.0001	<0.0001	<0.001	0.001	0.008	0.010
09 Oct 2024	SW02	EM2417600	<1	<0.001	<0.001	0.0001	<0.0001	0.002	<0.001	0.003	0.002	0.003	0.002	<0.0001	<0.0001	0.002	<0.001	0.040	0.031
09 Oct 2024	SW03	EM2417600	<1	<0.001	<0.001	<0.0001	<0.0001	<0.001	<0.001	0.005	0.005	0.002	<0.001	<0.0001	<0.0001	0.001	<0.001	0.037	0.022
09 Oct 2024	SW_HYDRANT	EM2417600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Statistics

Number of Results	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Number of Detects	0	2	1	2	0	2	1	4	4	3	2	0	0	3	2	4	4
Minimum Concentration	<1	0.001	<0.001	0.0001	<0.0001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.0001	<0.0001	0.001	0.001	0.008	0.01
Minimum Detect	ND	0.001	0.008	0.0001	ND	0.002	0.01	0.001	0.001	0.002	0.002	ND	ND	0.001	0.001	0.008	0.01
Maximum Concentration	<1	0.063	0.008	0.0001	<0.0001	0.061	0.01	0.053	0.023	0.022	0.011	<0.0001	<0.0001	0.041	0.018	0.094	0.037
Maximum Detect	ND	0.063	0.008	0.0001	ND	0.061	0.01	0.053	0.023	0.022	0.011	ND	ND	0.041	0.018	0.094	0.037
Average Concentration *	0.5	0.016	0.0024	0.000075	0.00005	0.016	0.0029	0.016	0.0078	0.0069	0.0035	0.00005	0.00005	0.011	0.005	0.045	0.025
Geometric Average *	0.5	0.002	0.001	0.000071	0.00005	0.0024	0.0011	0.0053	0.0039	0.0029	0.0015	0.00005	0.00005	0.0025	0.0015	0.032	0.022
Median Concentration *	0.5	0.00075	0.0005	0.000075	0.00005	0.00125	0.0005	0.004	0.0035	0.0025	0.00125	0.00005	0.00005	0.0015	0.00075	0.0385	0.0265
Standard Deviation *	0	0.031	0.0038	0.000029	0	0.03	0.0048	0.025	0.01	0.01	0.005	0	0	0.02	0.0087	0.036	0.012
Geometric Standard Deviation *	1	10	4	1.5	1	9.7	4.5	5.3	3.9	4.8	4.3	1	1	7	5.5	2.8	1.8
95% UCL (Student's-t) *	0.5	0.0529	0.00679	0.00010897	0.00005	0.0513	0.00846	0.045	0.0199	0.0188	0.00944	0.00005	0.00005	0.0346	0.0152	0.087	0.0388
% of Detects	0	50	25	50	0	50	25	100	100	75	50	0	0	75	50	100	100
% of Non-Detects	100	50	75	50	100	50	75	0	0	25	50	100	100	25	50	0	0

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value sys
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



Appendix F
Table 3
Surface Water Analytical Results

	Alkalinity (Carbonate as CaCO3)	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids									
		Perfluorobutane sulfonic acid (PFBS)	Perfluorodecanesulfonic acid (PFDS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctanoic acid (PFOA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTriDA)
EQL	1	0.0005	0.0005	0.0005	0.0002	0.0005	0.0005	0.002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system					0.13									220			
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system					0.00023									19			
PFAS NEMP 2.0 2020 Recreational Water					2		2							10			

Date	Field ID	Lab Report Number																
09 Oct 2024	SW01	EM2417600	<1	<0.0005	<0.0005	<0.0005	0.0081	<0.0005	0.0026	<0.0020	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	0.0006	<0.0005	<0.0005
09 Oct 2024	SW02	EM2417600	<1	0.0007	<0.0005	<0.0005	0.0120	<0.0005	0.0046	<0.0020	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	0.0006	<0.0005	<0.0005
09 Oct 2024	SW03	EM2417600	<1	0.0045	<0.0005	0.0019	0.0492	0.0026	0.0268	<0.0020	0.0007	<0.0005	0.0018	0.0146	<0.0005	0.0031	0.0023	<0.0005
09 Oct 2024	SW_HYDRANT	EM2417600	-	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005 ^{#2}	<0.0005

Statistics

Number of Results	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Number of Detects	0	7	0	7	10	7	9	4	1	0	6	9	2	9	7	0	0
Minimum Concentration	<1	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Minimum Detect	ND	0.0007	ND	0.0012	0.0008	0.0026	0.0026	0.08	0.0007	ND	0.0018	0.0012	0.003	0.0006	0.0008	ND	ND
Maximum Concentration	<1	13.5	<0.0005	2.82	36.4	13.9	73.7	3.77	0.0007	<0.0005	3.2	31.1	0.0377	4.66	7.04	<0.0008	<0.0005
Maximum Detect	ND	13.5	ND	2.82	36.4	13.9	73.7	3.77	0.0007	ND	3.2	31.1	0.0377	4.66	7.04	ND	ND
Average Concentration *	0.5	1.9	0.00025	0.31	3.9	1.7	8.4	0.53	0.0003	0.00025	0.36	3.9	0.0044	0.5	0.96	0.0003	0.00025
Geometric Average *	0.5	0.021	0.00025	0.007	0.093	0.02	0.096	0.013	0.00028	0.00025	0.0066	0.049	0.00067	0.0095	0.013	0.00029	0.00025
Median Concentration *	0.5	0.01425	0.00025	0.00245	0.0432	0.0082	0.04435	0.001	0.00025	0.00025	0.00295	0.0171	0.00025	0.00595	0.00455	0.00025	0.00025
Standard Deviation *	0	4.2	0	0.88	11	4.3	23	1.2	0.00014	0	1	9.7	0.012	1.5	2.2	0.000072	0
Geometric Standard Deviation *	1	72	1	26	22	58	51	31	1.4	1	33	53	5.2	23	53	1.3	1
95% UCL (Student's-t) *	0.5	4.303	0.00025	0.824	10.54	4.22	21.78	1.215	0.00037749	0.00025	0.944	9.517	0.0112	1.349	2.242	0.000337	0.00025
% of Detects	0	70	0	70	100	70	90	40	10	0	60	90	20	90	70	0	0
% of Non-Detects	100	30	100	30	0	30	10	60	90	100	40	10	80	10	30	100	100

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value sys
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



	Alkalinity (Carbonate as CaCO3)	Perfluoroundecanoic acid (PFUnDA)	PFAS - Perfluoroalkyl Sulfonamide							PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums		
			N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	Perfluorooctane sulfonamide (FOSA)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)	Sum of PFHxS and PFOS
	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL	1	0.0005	0.001	0.0005	0.001	0.001	0.0005	0.001	0.0005	0.001	0.001	0.001	0.001	0.0002	0.0002	0.0002
PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system																
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system																
PFAS NEMP 2.0 2020 Recreational Water																2

Date	Field ID	Lab Report Number																
09 Oct 2024	SW01	EM2417600	<1	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0125	0.0125	0.0107
09 Oct 2024	SW02	EM2417600	<1	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.001	0.001	<0.001	0.0207	0.0207	0.0166
09 Oct 2024	SW03	EM2417600	<1	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.001	0.013	0.002	0.122	0.117	0.0760
09 Oct 2024	SW_HYDRANT	EM2417600	-	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.001	0.002	<0.001	0.0028	0.0028	0.0008

Statistics

Number of Results	4	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Number of Detects	0	0	0	0	0	0	0	0	2	0	0	7	1	10	10	10
Minimum Concentration	<1	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.0005	<0.001	<0.001	0.001	<0.001	0.0028	0.0028	0.0008
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	0.003	ND	ND	0.001	0.002	0.0028	0.0028	0.0008
Maximum Concentration	<1	<0.0005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	0.0097	<0.001	<0.001	1.8	0.002	198	175	110
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	0.0097	ND	ND	1.8	0.002	198	175	110
Average Concentration *	0.5	0.00025	0.0005	0.00025	0.0005	0.0005	0.00025	0.0005	0.0015	0.0005	0.0005	0.18	0.00065	24	21	12
Geometric Average *	0.5	0.00025	0.0005	0.00025	0.0005	0.0005	0.00025	0.0005	0.00046	0.0005	0.0005	0.0031	0.00057	0.42	0.38	0.22
Median Concentration *	0.5	0.00025	0.0005	0.00025	0.0005	0.0005	0.00025	0.0005	0.00025	0.0005	0.0005	0.0015	0.0005	0.153	0.1405	0.08755
Standard Deviation *	0	0	0	0	0	0	0	0	0.003	0	0	0.57	0.00047	62	55	34
Geometric Standard Deviation *	1	1	1	1	1	1	1	1	3.8	1	1	12	1.6	39	37	36
95% UCL (Student's-t) *	0.5	0.00025	0.0005	0.00025	0.0005	0.0005	0.00025	0.0005	0.00322	0.0005	0.0005	0.512	0.00092497	59.31	52.24	32.27
% of Detects	0	0	0	0	0	0	0	0	20	0	0	70	10	100	100	100
% of Non-Detects	100	100	100	100	100	100	100	100	80	100	100	30	90	0	0	0

* A Non Detect Multiplier of 0.5 has been applied.

Comments

- #1 For indicative purposes only
#2 Reported Analyte LOR is higher than Requested Analyte LOR

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed
HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value sys
HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water



Appendix F
Table 4
Historical Soil Analytical Results

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	Inorganics	PFAS - Perfluoroalkyl Sulfonic Acids						PFAS - Perfluoroalkyl Carboxylic Acids								PFAS - Perfluoroalkyl
	Moisture (%)	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)	
	%	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	0.1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0005	0.0005	0.0005	0.0005
PFAS NEMP 2.0 2020 Ecological direct exposure						1					10					
PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites						0.14										
PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)				2		2					20					
SA MFS Site Specific Criteria - Metropolitan (Staffed)				40		40					50					

Location Code	Date	Lab Report Number	Field ID	Depth																
BH01		39765	BH01 0.1	0.1 - 0.2	4.9	<0.0001	<0.0001	0.0017	0.0003	0.054	0.0004	<0.0002	<0.0002	<0.0001	<0.0001	0.0003	<0.0001	<0.0005	<0.0005	<0.0005
			BH01 1.0	1.0 - 1.1	8.8	0.0004	0.0004	0.051	0.0038	0.15	0.0006	<0.0002	0.0004	0.0043	0.0016	0.0042	0.0001	<0.0005	<0.0005	<0.0005
		39765-B	BH01 1.5	1.5 - 1.6	7.9	0.0033	0.0084	0.072	0.011	0.28	0.0004	0.0006	0.0029	0.02	0.0027	0.0079	<0.0002	<0.0005	<0.0005	<0.0005
BH02	18 Sep 2023	39765	BH02 0.1	0.1 - 0.2	10	0.0002	0.0003	0.0031	0.0001	0.0021	<0.0002	<0.0002	0.0005	0.0009	0.0004	0.0002	0.0002	<0.0005	<0.0005	<0.0005
			BH02 1.5	1.5 - 1.6	10	0.0036	0.0038	0.022	0.0005	0.0051	<0.0002	0.0003	0.001	0.0068	0.0006	0.0007	<0.0001	<0.0005	<0.0005	<0.0005
BH03	18 Sep 2023	39765	BH03 0.1	0.1 - 0.2	3.6	0.0040	0.0072	0.079	0.0050	0.042	<0.0002	0.001	0.0021	0.014	0.0029	0.01	0.001	<0.0005	<0.0005	<0.0005
			BH03 1.0	1.0 - 1.1	7.2	0.0094	0.0081	0.034	0.0006	0.0021	<0.0002	0.0026	0.0050	0.026	0.0015	0.0014	<0.0001	<0.0005	<0.0005	<0.0005
BH04	18 Sep 2023	39765	BH04 0.5	0.5 - 0.6	12	0.0096	0.0057	0.059	0.0041	0.0023	<0.0002	0.0066	0.012	0.033	0.0028	0.012	<0.0001	<0.0005	<0.0005	<0.0005
			BH04 2.0	2.0 - 2.1	15	0.0028	0.0048	0.024	0.0003	0.0026	<0.0002	0.0002	0.0008	0.011	0.0017	0.0014	<0.0001	<0.0005	<0.0005	<0.0005
BH05	18 Sep 2023	39765	BH05 0.1	0.1 - 0.2	9.9	0.0097	0.0028	0.045	0.017	0.11	<0.0002	0.0065	0.011	0.019	0.0013	0.0055	0.0003	<0.0005	<0.0005	<0.0005
			BH05 1.0	1.0 - 1.1	9.1	0.0083	0.021	0.075	0.0023	0.019	<0.0002	0.0006	0.001	0.023	0.0038	0.0026	<0.0001	<0.0005	<0.0005	<0.0005
BH06	18 Sep 2023	39765	BH06 0.5	0.5 - 0.6	9.4	0.026*	0.012*	0.03*	0.0004	0.011*	<0.0002	0.0078*	0.012*	0.063*	0.0013*	0.0014*	<0.0001	<0.0005	<0.0005	<0.0005
			BH06 2.5	2.5 - 2.6	26	0.0027	0.0023	0.0097	0.0002	0.0019	<0.0002	0.0006	0.001	0.0052	0.0004	0.0003	<0.0001	<0.0005	<0.0005	<0.0005
BH07	19 Sep 2023	39765	BH07 0.5	0.5 - 0.6	9.2	0.0053	0.012	0.12	0.011	0.14	<0.0002	0.001	0.0023	0.019	0.0034	0.0073	0.0001	<0.0005	<0.0005	<0.0005
			BH07 1.0	1.0 - 1.1	6.6	0.0051	0.0072	0.051	0.0017	0.034	<0.0002	0.001	0.0027	0.017	0.0014	0.0012	<0.0001	<0.0005	<0.0005	<0.0005
BH08	23 Sep 2024	EM2416721	BH08 0-0.2	0 - 0.2	3.7	0.0002	0.0003	0.0048	0.0003	0.0654	0.0059	<0.001	<0.0002	0.0004	<0.0002	0.0003	<0.0002	0.0002	0.0004	<0.0002
	23 Sep 2024	EM2416721	BH08 0.5	0.5	3.8	<0.0002	0.0002	0.0076	0.0007	0.121	0.0004	<0.001	<0.0002	0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002
	23 Sep 2024	EM2416721	BH08 1.5	1.5	14.6	0.0004	0.0004	0.0010	<0.0002	0.0070	<0.0002	<0.001	0.0003	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
BH09	23 Sep 2024	EM2416721	BH09 0-0.2	0 - 0.2	24.8	<0.0002	<0.0002	0.0013	<0.0002	0.0132	0.0020	<0.001	<0.0002	0.0004	<0.0002	0.0003	<0.0002	<0.0002	0.0003	<0.0002
	23 Sep 2024	EM2416721	BH09 0.5	0.5	3.5	<0.0002	0.0004	0.0059	<0.0002	0.0132	0.0004	<0.001	0.0002	0.0007	0.0003	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	23 Sep 2024	EM2416721	BH09 1.5	1.5	3.6	<0.0002	<0.0002	0.0024	0.0033	0.203	<0.0002	<0.001	<0.0002	0.0002	<0.0002	0.0011	0.0007	<0.0002	<0.0002	<0.0002
BH10	24 Sep 2024	EM2416721	BH10 0-0.2	0 - 0.2	7.4	0.0023	0.0012	0.0036	0.0003	0.0607	<0.0002	0.002	0.0024	0.0065	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002
	24 Sep 2024	EM2416721	BH10 0.5	0.5	6.5	0.0014	0.0013	0.0154	0.0006	0.0034	<0.0002	0.002	0.0016	0.0044	0.0004	0.0011	<0.0002	<0.0002	<0.0002	<0.0002
	24 Sep 2024	EM2416721	BH10 1.5	1.5	10.4	0.0017	0.0012	0.0057	<0.0002	0.0008	<0.0002	<0.001	0.0008	0.0041	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
BH11	24 Sep 2024	EM2416721	BH11 0-0.2	0 - 0.2	6.7	0.0165	0.0096	0.0178	0.0003	0.0088	<0.0002	0.004	0.0092	0.0497	0.0012	0.0005	<0.0002	<0.0002	<0.0002	<0.0002
	24 Sep 2024	EM2416721	BH11 0.5	0.5	10.6	0.0144	0.0236	0.283	0.0118	0.0079	<0.0002	0.002	0.0062	0.0605	0.0057	0.0214	<0.0002	<0.0002	<0.0002	<0.0002
	24 Sep 2024	EM2416721	BH11 1.5	1.5	10.9	0.0026	0.0068	0.0625	0.0033	0.0520	<0.0002	<0.001	0.0009	0.0122	0.0013	0.0034	<0.0002	<0.0002	<0.0002	<0.0002
BH12	24 Sep 2024	EM2416721	BH12 0.4-0.5	0.4 - 0.5	7.6	0.0004	0.0008	0.0137	0.0008	0.0116	<0.0002	<0.001	0.0006	0.0011	0.0005	0.0014	<0.0002	<0.0002	<0.0002	<0.0002
	24 Sep 2024	EM2416721	BH12 1.0	1	9.7	0.0005	0.0007	0.0028	<0.0002	0.0007	<0.0002	<0.001	0.0005	0.0017	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
MW01	19 Sep 2023	39765	MW01 0.5	0.5 - 0.6	7.1	<0.0001	<0.0001	0.0002	<0.0001	0.0049	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005
			MW01 2.5	2.5 - 2.6	6.6	0.0005	0.0013	0.019	0.0011	0.019	<0.0002	<0.0002	<0.0002	0.0022	0.0006	0.0012	<0.0001	<0.0005	<0.0005	<0.0005
MW02	19 Sep 2023	39765	MW02 0.1	0.1 - 0.2	8.7	0.0002	0.0002	0.0053	0.0030	0.32	0.002	0.0008	0.002	0.0024	0.0007	0.0023	0.0032	0.003	0.0095	0.0007
			MW02 3.0	3.0 - 3.1	26	0.0027	0.0029	0.02	0.0011	0.031	<0.0002	0.001	0.0032	0.011	0.0022	0.0026	<0.0001	<0.0005	<0.0005	<0.0005
MW03	19 Sep 2023	39765	MW03 0.5	0.5 - 0.6	8.4	0.0058	0.0031	0.03	0.0010	0.019	<0.0002	0.0045	0.018	0.017	0.011	0.0019	<0.0001	<0.0005	<0.0005	<0.0005
			MW03 2.0	2.0 - 2.1	18	0.0002*	0.0001	0.0012	<0.0001	0.0008	<0.0002	<0.0002	<0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0005	<0.0005
MW04	23 Sep 2024	EM2416721	MW04 0-0.2	0 - 0.2	2.4	0.0002	0.0002	0.0022	<0.0002	0.0083	<0.0002	<0.001	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
MW04	23 Sep 2024	EM2416721	MW04 3.0	3	18.2	0.0043	0.0043	0.0249	0.0008	0.0129	<0.0002	<0.001	0.0015	0.0076	0.0007	0.0012	<0.0002	<0.0002	<0.0002	<0.0002
MW05	23 Sep 2024	EM2416721	MW05 0-0.2	0 - 0.2	1.7	<0.0002	<0.0002	<0.0002	<0.0002	0.0020	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
MW05	23 Sep 2024	EM2416721	MW05 7.0	7	17.2	<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
MW06	24 Sep 2024	EM2416721	MW06 0-0.2	0 - 0.2	5.5	<0.0002	<0.0002	0.0011	<0.0002	0.0011	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	0.0008	<0.0002	<0.0002	<0.0002	<0.0002
MW06	24 Sep 2024	EM2416721	MW06 3.0	3	19.6	<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
SS01	19 Sep 2023	39765	SS01	0.0 - 0.1	0.6	0.0002	0.0001	0.0014	0.0003	0.05	0.0009	0.001	0.001	0.0005	0.0002	0.0005	0.0008	0.003	<0.005	<0.005
SS02	19 Sep 2023	39765	SS02	0.0 - 0.1	5.4	<0.0001	<0.0001	0.0002	0.0002	0.22*	0.0004	<0.0002	<0.0002	<0.0001	<0.0001	0.0002	0.0005	<0.0005	<0.0005	<0.0005
SS03	19 Sep 2023	39765	SS03	0.0 - 0.1	5.8	0.0001	<0.0001	0.0014	0.0002	0.0023	<0.0002	0.0005	0.0003	0.0005	0.0003	0.0038	<0.0001	<0.0005	<0.0005	<0.0005
SS04	19 Sep 2023	39765	SS04	0.0 - 0.1	6.1	<0.0001	<0.0001	0.0012	0.0006	1	0.0006	<0.0002	<0.0002	0.0003	<0.0001	0.0004	<0.001	<0.0005	<0.0005	<0.0005
SS05	19 Sep 2023	39765	SS05	0.0 - 0.1	5.5	0.0005	0.0002	0.0018	0.0017	1.8	<0.0002	0.001	0.0008	0.0030	0.0003	0.0004	<0.001	<0.0005	<0.0005	<0.0005
SS06	19 Sep 2023	39765	SS06	0.0 - 0.1	8.6	0.0001	<0.0001	0.0018	0.0067	0.										



Appendix F
Table 4
Historical Soil Analytical Results

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					Perfluoroalkyl Carboxylic Acids		PFAS - Perfluoroalkyl Sulfonamide							PFAS - Fluorotelomer Sulfonic Acids			
					Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	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)
					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					0.0005	0.005	0.001	0.001	0.001	0.0002	0.001	0.005	0.0002	0.0001	0.0001	0.0002	0.0002
PFAS NEMP 2.0 2020 Ecological direct exposure																	
PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites																	
PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)																	
SA MFS Site Specific Criteria - Metropolitan (Staffed)																	
Location Code	Date	Lab Report Number	Field ID	Depth													
BH01		39765	BH01 0.1	0.1 - 0.2	<0.0005	<0.005	0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.0018	<0.0002	<0.0002
			BH01 1.0	1.0 - 1.1	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.0053	<0.0002	<0.0002
		39765-B	BH01 1.5	1.5 - 1.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.0026	<0.0002	<0.0002
BH02	18 Sep 2023	39765	BH02 0.1	0.1 - 0.2	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.0004	<0.0002	<0.0002
			BH02 1.5	1.5 - 1.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
BH03	18 Sep 2023	39765	BH03 0.1	0.1 - 0.2	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.015	<0.0002	<0.0002
			BH03 1.0	1.0 - 1.1	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
BH04	18 Sep 2023	39765	BH04 0.5	0.5 - 0.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
			BH04 2.0	2.0 - 2.1	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
BH05	18 Sep 2023	39765	BH05 0.1	0.1 - 0.2	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.069	<0.0002	<0.0002
			BH05 1.0	1.0 - 1.1	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
BH06	18 Sep 2023	39765	BH06 0.5	0.5 - 0.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
			BH06 2.5	2.5 - 2.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
BH07	19 Sep 2023	39765	BH07 0.5	0.5 - 0.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
			BH07 1.0	1.0 - 1.1	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
BH08	23 Sep 2024	EM2416721	BH08 0-0.2	0 - 0.2	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	23 Sep 2024	EM2416721	BH08 0.5	0.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	23 Sep 2024	EM2416721	BH08 1.5	1.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
BH09	23 Sep 2024	EM2416721	BH09 0-0.2	0 - 0.2	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	23 Sep 2024	EM2416721	BH09 0.5	0.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	23 Sep 2024	EM2416721	BH09 1.5	1.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
BH10	24 Sep 2024	EM2416721	BH10 0-0.2	0 - 0.2	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	24 Sep 2024	EM2416721	BH10 0.5	0.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	24 Sep 2024	EM2416721	BH10 1.5	1.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
BH11	24 Sep 2024	EM2416721	BH11 0-0.2	0 - 0.2	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	24 Sep 2024	EM2416721	BH11 0.5	0.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	24 Sep 2024	EM2416721	BH11 1.5	1.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
BH12	24 Sep 2024	EM2416721	BH12 0.4-0.5	0.4 - 0.5	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
	24 Sep 2024	EM2416721	BH12 1.0	1	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
MW01	19 Sep 2023	39765	MW01 0.5	0.5 - 0.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
			MW01 2.5	2.5 - 2.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.0002	<0.0002	<0.0002
MW02	19 Sep 2023	39765	MW02 0.1	0.1 - 0.2	0.002	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.0058	0.0090	0.0035
			MW02 3.0	3.0 - 3.1	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.0069	<0.0002	<0.0002
MW03	19 Sep 2023	39765	MW03 0.5	0.5 - 0.6	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	0.02	<0.0002	<0.0002
			MW03 2.0	2.0 - 2.1	<0.0005	<0.005	<0.001	<0.001	<0.001	<0.0002	<0.001	<0.005	<0.0002	<0.0001	<0.0001	<0.0002	<0.0002
MW04	23 Sep 2024	EM2416721	MW04 0-0.2	0 - 0.2	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
MW04	23 Sep 2024	EM2416721	MW04 3.0	3	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
MW05	23 Sep 2024	EM2416721	MW05 0-0.2	0 - 0.2	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
MW05	23 Sep 2024	EM2416721	MW05 7.0	7	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
MW06	24 Sep 2024	EM2416721	MW06 0-0.2	0 - 0.2	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005
MW06	24 Sep 2024	EM2416721	MW06 3.0	3	<0.0002	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005		



Appendix F
Table 4
Historical Soil Analytical Results

MFS
12647854
MFS Port Augusta Further DSI

	PFAS - Sums		
	Sum of PFHxS and PFOS	Sum of US EPA PFAS (PFOS + PFOA)*	PFAS (Sum of Total)
	mg/kg	mg/kg	mg/kg
EQL	0.0001	0.0001	0.0001
PFAS NEMP 2.0 2020 Ecological direct exposure			
PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites			
PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)	2		
SA MFS Site Specific Criteria - Metropolitan (Staffed)	40		

Location Code	Date	Lab Report Number	Field ID	Depth			
BH01		39765	BH01 0.1	0.1 - 0.2	0.055	0.054	0.059
			BH01 1.0	1.0 - 1.1	0.2	0.16	0.23
		39765-B	BH01 1.5	1.5 - 1.6	0.35	0.29	0.41
BH02	18 Sep 2023	39765	BH02 0.1	0.1 - 0.2	0.0052	0.0023	0.0084
			BH02 1.5	1.5 - 1.6	0.027	0.0058	0.044
BH03	18 Sep 2023	39765	BH03 0.1	0.1 - 0.2	0.12	0.052	0.18
			BH03 1.0	1.0 - 1.1	0.036	0.0035	0.09
BH04	18 Sep 2023	39765	BH04 0.5	0.5 - 0.6	0.061	0.014	0.15
			BH04 2.0	2.0 - 2.1	0.027	0.0041	0.05
BH05	18 Sep 2023	39765	BH05 0.1	0.1 - 0.2	0.16	0.12	0.3
			BH05 1.0	1.0 - 1.1	0.094	0.022	0.16
BH06	18 Sep 2023	39765	BH06 0.5	0.5 - 0.6	0.041*	0.011*	0.1728*
			BH06 2.5	2.5 - 2.6	0.012	0.0022	0.025
BH07	19 Sep 2023	39765	BH07 0.5	0.5 - 0.6	0.26	0.15	0.33
			BH07 1.0	1.0 - 1.1	0.085	0.035	0.12
BH08	23 Sep 2024	EM2416721	BH08 0-0.2	0 - 0.2	0.0702		0.0782
	23 Sep 2024	EM2416721	BH08 0.5	0.5	0.129		0.131
	23 Sep 2024	EM2416721	BH08 1.5	1.5	0.0080		0.0095
BH09	23 Sep 2024	EM2416721	BH09 0-0.2	0 - 0.2	0.0145		0.0175
	23 Sep 2024	EM2416721	BH09 0.5	0.5	0.0191		0.0213
	23 Sep 2024	EM2416721	BH09 1.5	1.5	0.205		0.211
BH10	24 Sep 2024	EM2416721	BH10 0-0.2	0 - 0.2	0.0643		0.0794
	24 Sep 2024	EM2416721	BH10 0.5	0.5	0.0188		0.0316
	24 Sep 2024	EM2416721	BH10 1.5	1.5	0.0065		0.0145
BH11	24 Sep 2024	EM2416721	BH11 0-0.2	0 - 0.2	0.0266		0.118
	24 Sep 2024	EM2416721	BH11 0.5	0.5	0.291		0.436
	24 Sep 2024	EM2416721	BH11 1.5	1.5	0.114		0.145
BH12	24 Sep 2024	EM2416721	BH12 0.4-0.5	0.4 - 0.5	0.0253		0.0309
	24 Sep 2024	EM2416721	BH12 1.0	1	0.0035		0.0071
MW01	19 Sep 2023	39765	MW01 0.5	0.5 - 0.6	0.0051	0.0049	0.0051
			MW01 2.5	2.5 - 2.6	0.038	0.02	0.045
MW02	19 Sep 2023	39765	MW02 0.1	0.1 - 0.2	0.33	0.33	0.38
			MW02 3.0	3.0 - 3.1	0.051	0.033	0.084
MW03	19 Sep 2023	39765	MW03 0.5	0.5 - 0.6	0.049	0.021	0.13
			MW03 2.0	2.0 - 2.1	0.0020	0.0008	0.0023
MW04	23 Sep 2024	EM2416721	MW04 0-0.2	0 - 0.2	0.0105		0.0112
MW04	23 Sep 2024	EM2416721	MW04 3.0	3	0.0378		0.0582
MW05	23 Sep 2024	EM2416721	MW05 0-0.2	0 - 0.2	0.0020		0.0020
MW05	23 Sep 2024	EM2416721	MW05 7.0	7	<0.0002		<0.0002
MW06	24 Sep 2024	EM2416721	MW06 0-0.2	0 - 0.2	0.0022		0.0030
MW06	24 Sep 2024	EM2416721	MW06 3.0	3	<0.0002		<0.0002
SS01	19 Sep 2023	39765	SS01	0.0 - 0.1	0.051	0.05	0.077
SS02	19 Sep 2023	39765	SS02	0.0 - 0.1	0.22*	0.22*	0.22*
SS03	19 Sep 2023	39765	SS03	0.0 - 0.1	0.0038	0.0062	0.13
SS04	19 Sep 2023	39765	SS04	0.0 - 0.1	1	1	1
SS05	19 Sep 2023	39765	SS05	0.0 - 0.1	1.8	1.8	1.8
SS06	19 Sep 2023	39765	SS06	0.0 - 0.1	0.55	0.54	0.55
SS07	19 Sep 2023	39765	SS07	0.0 - 0.1	0.11	0.11	0.12
SS08 0-0.1	23 Sep 2024	EM2416721	SS08 0-0.1	0 - 0.1	0.0922		0.112
SS08 0.2-0.3	23 Sep 2024	EM2416721	SS08 0.2-0.3	0.2 - 0.3	0.0822		0.0976
SS09 0-0.1	23 Sep 2024	EM2416721	SS09 0-0.1	0 - 0.1	0.0030		0.0030
SS09-0.2-0.3	23 Sep 2024	EM2416721	SS09-0.2-0.3	0.2 - 0.3	0.0013		0.0013



Table 5
Historical Groundwater
Analytical Results

SA MFS
Port Augusta DSI

				PFAS - Perfluoroalkyl Sulfonic Acids							PFAS - Perfluoroalkyl Carboxylic Acids											
				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 (PFTrDA)	Perfluorotetradecanoic acid (PFTeDA)	
				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				0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value ecosystem									0.00023						19							
PFAS NEMP 2.0 2020 Interim marine - 95% - slightly-to-moderately disturbed ecosystem									0.13						220							
ADWG 2011 Recreational (v3.7 updated 2022)							0.7		0.7						5.6							

Location Code	Date	Field ID	Lab Report Number																		
MW01	28 Sep 2023	MW01	1031199	0.27*	0.83*	0.52*	3.3*	0.22*	6.1*	<0.01	0.16*	0.32	1.1	0.05	0.85	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	08 Oct 2024	MW01	EM2417600		0.215	0.180	0.414	0.0778	1.73	<0.0005	0.0800	0.119	0.378	0.0618	0.0221	<0.0016 ⁴²	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW02	28 Sep 2023	MW02	1031199	3.4	7.0	3.6	14	0.13	1.9	<0.01	1.6	3.2	11	0.44	0.34	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	08 Oct 2024	MW02	EM2417600		3.17	1.87	6.38	0.125	0.545	<0.0005	1.03	1.81	5.33	0.266	0.200	0.0030	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW03	28 Sep 2023	MW03	1031199	1.5	3.1	1.5	6.8	0.21	0.56	<0.01	0.76	0.93	3.0	0.23	0.29	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	08 Oct 2024	MW03	EM2417600		1.63	1.13	3.60	0.0996	0.380	<0.0005	0.396	0.620	2.03	0.107	0.115	<0.0016 ⁴²	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW04	09 Oct 2024	MW04	EM2417600		13.5	13.9	73.7	2.82	36.4	<0.0005	3.77	7.04	31.1	3.20	4.66	0.0377	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008 ⁴²
MW05	09 Oct 2024	MW05	EM2417600		<0.0005	0.0050	0.0186	0.0012	0.0256	<0.0005	<0.0020	0.0008	0.0044	<0.0005	0.0010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0008 ⁴²
MW06	09 Oct 2024	MW06	EM2417600		0.0240	0.0114	0.0619	0.0030	0.0372	<0.0005	<0.0020	0.0068	0.0196	0.0041	0.0088	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Note: * Higher QA/QC result reported.



Table 5
Historical Groundwater
Analytical Results

SA MFS
Port Augusta DSI

					PFAS - Perfluoroalkyl Sulfonamide							PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums					PFAS - Other	
				Perfluoropropanesulfonic acid (PFPrS)	Perfluorooctane sulfonamide (FOSA)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	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	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)	
				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	
				0.01	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.1	0.01	0.05	0.01
EQL																						
PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value ecosystem																						
PFAS NEMP 2.0 2020 Interim marine - 95% - slightly-to-moderately disturbed ecosystem																						
ADWG 2011 Recreational (v3.7 updated 2022)																0.7						
Location Code	Date	Field ID	Lab Report Number																			
MW01	28 Sep 2023	MW01	1031199	0.27*	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.13	<0.01	<0.01	9.4*	6.83*	13.67*	10.13*	12.71*	<0.01	
	08 Oct 2024	MW01	EM2417600		0.0030	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	0.001	<0.001	<0.001	2.14	-	3.37	-	3.02	-	
MW02	28 Sep 2023	MW02	1031199	3.4	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	0.21	<0.01	<0.01	15.9	2.24	46.82	16.24	39.69	<0.01	
	08 Oct 2024	MW02	EM2417600		<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	0.008	<0.001	<0.001	6.92	-	22.4	-	18.7	-	
MW03	28 Sep 2023	MW03	1031199	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.01	<0.01	7.36	0.85	18.88	7.65	15.67	<0.01	
	08 Oct 2024	MW03	EM2417600		<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.001	3.98	-	11.0	-	8.88	-	
MW04	09 Oct 2024	MW04	EM2417600		0.0097	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	1.80	<0.001	<0.001	110	-	198	-	175	-	
MW05	09 Oct 2024	MW05	EM2417600		<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.001	<0.001	0.0442	-	0.0590	-	0.0504	-	
MW06	09 Oct 2024	MW06	EM2417600		<0.0005	<0.001	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	0.002	<0.001	<0.001	0.0991	-	0.184	-	0.164	-	

Note: * Higher QA/QC result reported.

Appendix G

Groundwater Purge Records



Client: MFS	WL Meter Type: Dip / Fox Int. Fcsl Gge
Project: MFS Port Augusta further DSI	Date: 09/10/27
Job No.: 126478.54	Time: 1pm
Location: Port Augusta	Sampler: JA - LW

[illegible]

Bore ID: MW01

Job Information		Sampling Information		Bore Information	
Client: MFS		Purge Method:		SWL(mbTOC): 2.926	m
Project: MFS pt Augusta Dr		Sample Method: Bladder pump		Screen: From: 4.8 to: 1.8	m
Proj. No.: 12647854		WQ Meter Type: YSI		NAPL Check:	
Sampler: JA, LW		Flow Cell: Y / N	Pump Depth: 3.5	Ref.datum:	
Date: 09/10/24		WLevel Meter Type:	Dip / Fox / Int.Fce / Gge	Bore Depth: 4.869	m
Round:		Field Filtered? Y / N (filter vessel, disposable filter/syringe)			
				Logic Check:	
				Stick Up: 4.869	m
				Bore Diam.: 50	mm
				Well Cap Secure? Y	

[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			



Purging and Sampling Record

Bore ID: MW02

Job Information		Sampling Information		Bore Information	
Client: <u>MFS</u>	Purge Method:	SWL(mbTOC): <u>2.157</u>	m	Logic Check:	
Project: <u>MFS Pt Augusta PSI</u>	Sample Method: <u>Bladder pump</u>	Screen: From: <u>4</u> to: <u>1</u>	m	Stick Up: <u>4.1</u>	m
Proj. No.: <u>12647584</u>	WQ Meter Type: <u>YSI</u>	NAPL Check:		Bore Diam.: <u>50</u>	mm
Sampler: <u>JA, LW</u>	Flow Cell: <u>Y</u> / N	Pump Depth: <u>3</u>	m	Ref. datum:	Well Cap Secure? <u>Y</u>
Date: <u>09/10/24</u>	WLevel Meter Type: Dip / Fox / <u>Int.Fce</u> / Gge	Bore Depth: <u>4.100</u>	m		
Round:	Field Filtered? Y / N (filter vessel, disposable filter/syringe)				

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
1.40	0	21.7	6.61	19872	11.9	122.5	2.176		Refill 12.0 Discharge 3.0
1.43	1	21.3	6.81	19735	4.7	101.6	2.176		PSI 21.0
1.46	2	21.4	6.86	19751	3.4	92.1	2.176		
1.49	3	21.3	6.88	19693	2.7	83.6	2.176		
1.52	4	21.3	6.89	19696	2.3	74.1	2.176		
1.55	5	21.5	6.9	19745	2.0	64.2	2.176		

Field QA Checks:		Parameters												
Air bubbles in vials? Y / N Any violent reactions? Y / N		BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.				
Decontamination as per GHD procedure? Y / N		Preservatives												
Was sampling equipment pre-cleaned? Y / N														
COC updated? Y / N														

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			

Job Information	Sampling Information	Bore Information
Client: MFS	Purge Method:	SWL(mbTOC): 2.179 m
Project: MFS Pt Augusta OSI	Sample Method: Bladder pump	Screen: From: 4 to: 1 m
Proj. No.: 12647854	WQ Meter Type: YSI	Logic Check:
Sampler: JA, LW	Flow Cell: Y / N	Stick Up: 4.181 m
Date: 09/10/24	Pump Depth: 3 m	Bore Diam.: 50 mm
Round:	WLevel Meter Type: Dip / Fox / Int. Fce / Gge	Well Cap Secure? Y
	Field Filtered? Y / N (filter vessel, disposable filter/syringe)	Bore Depth: 4.181 m

[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			

Job Information	Sampling Information	Bore Information
Client: MFS	Purge Method:	SWL(mbTOC): 2.360 m
Project: MFS PF Augusta D51	Sample Method: Bladder pump	Screen: From: to: m
Proj. No.: 12647854	WQ Meter Type: 4.51	Logic Check:
Sampler: JA, LW	Flow Cell: ☒ Y ☐ N	Stick Up: 4.143 m
Date: 09/10/24	Pump Depth: 3 m	Bore Diam.: 50 mm
Round:	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Well Cap Secure? ☒ Y ☐ N
	Field Filtered? Y / N (filter vessel, disposable filter/syringe)	Bore Depth: 4.143 m

[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			



Purging and Sampling Record

Bore ID: MW05

Job Information		Sampling Information		Bore Information	
Client: <u>MPS</u>		Purge Method:		SWL(mbTOC): <u>5.8142</u>	m
Project: <u>MPS Pt Augusta DS1</u>		Sample Method: <u>Bladder pump</u>		Screen: From: <u>7</u> to: <u>4</u>	m
Proj. No.: <u>12647854</u>		WQ Meter Type: <u>YSI</u>		NAPL Check:	
Sampler: <u>JA, LW</u>		Flow Cell: <u>Y</u> / N	Pump Depth: <u>6</u> m	Ref.datum:	
Date: <u>09/10/24</u>		WLevel Meter Type: <u>Dip / Fox / Int.Fce / Gge</u>		Bore Depth: <u>7.024</u>	m
Round:		Field Filtered? Y / N (filter vessel, disposable filter/syringe)			

Time (.....)	Volume (L)	Temp (°C)	pH (pH units)	Elec.Cond (.....)	Dis.Oxygen (.....)	Ox-Red Pt. (± mV)	SWL (m TOC)	(.....)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings):		-	+/- 0.05 pH	+/- 3%	+/- 10%	+/- 10 mV	stable		
4.15	0	25.1	6.91	21234	10.2	98.9	5.859		
4.18	1	25	6.98	20114	15.2	84.2	5.859		
4.21	2	24.6	6.95	14259	23.3	76.9	5.859		
4.24	3	25.1	6.95	18183	18.8	69	5.859		
4.27	4	25.4	6.95	18383	17.1	64.7	5.859		

Field QA Checks:		Parameters									
Air bubbles in vials? Y / N Any violent reactions? Y / N		BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	
Decontamination as per GHD procedure? Y / N		Preservatives									
Was sampling equipment pre-cleaned? Y / N											
COC updated? Y / N											

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

Job Information		Sampling Information		Bore Information	
Client: MFS	Purge Method:	SWL(mbTOC): 1.646 m	Logic Check:		
Project: MFS Pt Aigu Aa 051	Sample Method: Bladder pump	Screen: From: 4 to: 1 m	Stick Up: 3.963 m		
Proj. No.: 126478524	WQ Meter Type: YSI	NAPL Check:	Bore Diam.: 100 mm		
Sampler: JA, LW	Flow Cell: Y / N	Ref.datum:	Well Cap Secure? Y		
Date: 09/10/24	Pump Depth: 2 m	Bore Depth: 3.963 m			
Round:	WLevel Meter Type: Dip / Fox / Int.Fce / Gge	Field Filtered? Y / N (filter vessel, disposable filter/syringe)			

[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			

Appendix H

Calibration Certificates

Oil / Water Interface Meter

Instrument **Interface Meter (50M)**
Serial No. **HS2-00353**



airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	
	Capacity	✓	4x >1.5V
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Tested by: _____ Trent Chase

Test date: 12/09/2024

Next Test due: 11/03/2025

Appendix I

QA/QC 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 supplementary detailed site investigation (DSI) were submitted to ALS and Eurofins, which are National Association of Testing Authorities (NATA) accredited laboratories, accredited to perform the required analysis.

The selected laboratories conducted all the requested analyses in accordance with the guidelines outlined in NEPM 1999 (as amended 2013).

The laboratories used for sample analysis are set out in Table 1.1.

Table 1.1 Analytical laboratories and reports

Laboratory	Primary or Secondary	NATA Certified for Analysis Requested	Report No
ALS	Primary	Yes	EM2416721 EM2417673
Eurofins	Secondary	Yes	1146138 1148893

The primary results for the supplementary DSI are outlined in the Appendix F of the supplementary DSI report, and the laboratory certificates of analysis are located in Appendix E. The QA/QC results are outlined in the tables at the end of this QA/QC report.

The data quality assessment detailed in the following pages refers to the data provided in these laboratory reports and the results of the QA/QC analysis. Please note this QA/QC report excludes results and laboratory reports from historical sampling events.

1.2 Data quality indicators

Table 1.2 sets out the QA/QC Data Quality Indicators (DQIs) used in the sampling investigation and outcomes for each of these for each DQI.

Table 1.2 Summary of QA/QC compliance for sampling

Item	Objective	Outcome	References
GHD Internal Procedures			
Comparison of field and analytical data	Agreement between visual and olfactory evidence with laboratory results	Achieved	Tabulated Analytical Results; Certificates of Analysis; Borelogs/Field Records.
Calibration of field instruments	Meet calibration specifications	Achieved	Copies of calibration certificates.
Chain of Custody documentation	Supply Chain of Custody Documentation with all samples	Achieved	Copies of Chain of Custody Documentation.
Sample analysis and extraction holding times	Comply with holding times	Achieved	ALS/Eurofins Laboratory Quality Control Reports.

Analysis of inter- and intra-laboratory duplicate samples	Analysis of duplicate samples in 10% of primary samples	Achieved	AS4482.1-2005 and US EPA NEPM 1999 (as amended 2013) and Eurofins/ALS certificates of analysis. PFAS NEMP 2.0
Analysis of duplicate and split samples	Frequencies and RPDs within guideline and internal laboratory limits (RPD of 0-30%)	Minor non-conformances as stated in Table 2.1	AS4482.1-2005 and US EPA NEPM 1999 (as amended 2013) and Eurofins/ALS certificates of analysis. PFAS NEMP 2.0
External Laboratory Procedures			
Analysis of laboratory method blanks	No contamination of blanks	Achieved	ALS/Eurofins Laboratory Quality Control Reports.
Analysis of laboratory spike recoveries	Recoveries within the laboratory specified recovery limits	Achieved	Eurofins/ALS Laboratory Quality Control Reports
Analysis of laboratory internal duplicates	Frequencies and RPDs within guideline and internal laboratory limits (RPD of 0-30%)	Minor non-conformances as staged in Table 3.1	NEPM 1999 (as amended 2013). Eurofins/ALS Laboratory Quality Control Reports

QA/QC assessment method

Established QA/QC procedures to assess data quality were maintained throughout the project. The QA/QC program undertaken as part of the assessment by GHD included the following:

- Use of appropriately qualified and trained staff.
- Preservation of samples with ice during transport from the field to the laboratory.
- Transportation of samples with accompanying chain-of-custody documentation.
- Compliance with sample holding times.
- Review of results of blind duplicate samples.
- Review of results of split duplicate samples.
- Review of results of field blank samples.
- Review of internal analysis of laboratory duplicates, spikes and blanks.

The QC program employed during this investigation was in accordance with the general requirements set out in the Australian Standard AS4482.1 (2005) and the NEMP 2.0 (2020) QC samples provide information that discounts or potentially identifies errors due to possible sources of cross contamination, inconsistencies in sampling and analytical techniques used. The QC program completed included the collection and analysis of duplicate samples, rinsate samples and trip blank samples as described below:

- **Split duplicate samples:** These are duplicate samples split in the field, with one sample being sent to a secondary laboratory for analysis. The same parameters are analysed utilising similar analytical techniques.
- **Blind duplicate samples:** These are coded duplicate samples submitted to the primary laboratory for analysis as individual samples without any indication to the laboratory that they have been duplicated.
- **Rinsate samples:** A sample of deionised water collected from equipment used during sampling to indicate whether cross contamination occurred from equipment.
- **Trip Blanks:** A laboratory supplied uncontaminated (blank) deionised water sample which is placed within the ice chest with the samples. This sample is analysed at the laboratory to indicate if contamination occurred during transportation of samples.

A quantitative measure of the duplicate sample results was made using calculated relative percentage difference (RPD) values for each chemical. The RPD values were calculated using the following equation.

$$RPD(\%) = \frac{(C_o - C_s)}{\left(\frac{C_o + C_s}{2}\right)} \times 100$$

Where C_o = reported concentration of the chemical of interest from the original parent sample

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 in at the end of this appendix report.

Table 2.1 *Blind duplicate and split duplicate RPD exceedance summary*[TW1] - soil

Primary Sample	QC Sample (Duplicate or Split)	Analyte	Primary result (mg/kg)	Duplicate Result (mg/kg)	Split result (mg/kg)	Highest RPD (%)
Soil						
BH08_1.5	QC02 (D) QA02 (S)	PFBS	0.0004	0.0010	<0.005	86
		PFOS	0.0070	0.0268	0.015	117
		PFHxS	0.0010	0.0036	<0.005	113
		PFHxA	0.0004	0.0009	<0.005	77
		PFPeA	0.0003	0.0008	<0.005	91
		PFAS (Sum of Total)	0.0091	0.0346	<0.05	114
		PFAS (Sum of Total) (WA DER List)	0.0091	0.0341	0.015	116
		Sum of PFHxS and PFOS	0.0080	0.0304	0.015	117
MW04_3.0	QC01 (D) QA01 (S)	PFOS	0.0129	0.0130	0.034	90
		PFHxA	0.0076	0.0075	0.011	37
		PFAS (Sum of Total) (WA DER List)	0.0531	0.0515	0.078	38
		Sum of PFHxS and PFOS	0.0378	0.0366	0.067	56
BH10_1.5	QC03 (D) QA03 (S)	PFPeS	0.0012	0.0025	<0.005	70
		PFHxS	0.0057	0.0157	<0.005	93
		PFHpA	<0.0002	0.0006	<0.005	100
		PFHxA	0.0041	0.0077	<0.005	61
		PFOA	0.0002	0.0007	<0.005	111
		PFPeA	0.0008	0.0015	<0.005	61
		PFAS (Sum of Total)	0.0145	0.0325	<0.05	77
		PFAS (Sum of Total) (WA DER List)	0.0133	0.0300	<0.01	77
		Sum of PFHxS and PFOS	0.0065	0.0166	0.0065	87
Water						
MW04	FD01 (D) FS01 (S)	PFBA	3.77	3.62	0.46	157

2.1.1 Soil blind duplicate and split duplicate

The majority of RPDs were calculated within acceptable limits, with the exception of some PFAS analytes in the blind and split samples for BH08_1.5 and the split sample for MW04_3.0. 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 of one PFAS analyte (PFBA) in one split sample. The elevated RPD can be attributed to the following:

- Low analyte concentrations close to or below the LOR.

2.1.3 Blind duplicate and split duplicate sample frequency

A summary of the blind and split duplicate sample frequency is presented in Table 2.2.

Table 2.2 Blind duplicate and split duplicate frequency summary

Primary Samples Count	Blind Duplicate Samples Count	Percentage of Primary Samples	Split Samples Count	Percentage of Primary Samples
Soil				
24	3	12.5%	3	12.5%
Water				
7	1	14.3%	1	14.3%

2.2 Rinsate blank

Three rinsate blank samples were collected during the investigation and analysed for PFAS. All concentrations of PFAS analytes were reported below the laboratory LOR. The tabulated results for rinsate samples are presented at the end of this appendix report.

3. Laboratory QA/QC

3.1 Internal duplicates

All RPDs for laboratory internal duplicates from the ALS and Eurofins reports were within the laboratory nominated acceptable ranges, with the exception of those outlined in Table 3.1.

Table 3.1 Laboratory internal duplicates

Laboratory Report	Primary Sample	Analyte	Internal QC RPD (%)	Acceptable RPD (%)
EM2416721	MW04_0-0.2	Sum of PFAS	24.0	0 - 20%
		Sum of PFHxS and PFOS	21.1	0 - 20%
		Sum of PFAS (WA DER List)	22.2	0 - 20%

3.2 Matrix spikes

All laboratory matrix spikes from the laboratory reports were within the nominated acceptable ranges.

3.3 Laboratory control spikes

All laboratory control spikes from the laboratory reports were within the nominated acceptable ranges.

3.4 Method blanks

All reported method blank concentrations were less than their respective laboratory LOR and indicating that potential laboratory cross contamination was unlikely to have occurred.

3.5 Compliance with holding times

All analytes were extracted and analysed within both ALS' and Eurofins' technical holding times, with the exception of water samples SW01, SW02, SW03, and MW04 which reported a holding time breach for nitrite (N) (ALS EM2417600). All PFAS analytes were within laboratory accepted holding times, meeting the Data Quality Objectives of the project.

3.6 Laboratory QA/QC summary

GHD considers the data to be of satisfactory precision on which to base the assessment.

3.7 Conclusion

Based on the QA/QC program undertaken during the sampling programs, the data obtained during the assessment is considered to be of an acceptable standard on which to base interpretations and draw conclusions regarding the environmental status of the site.



Location Code Date Field ID Lab Report Number Matrix Type Sample Type			BH08		RPD	BH08		RPD	MW04		RPD	MW04		RPD	BH10		RPD	BH10		RPD
			23 Sep 2024	23 Sep 2024		23 Sep 2024	23 Sep 2024		23 Sep 2024	23 Sep 2024		23 Sep 2024	23 Sep 2024		24 Sep 2024	24 Sep 2024		24 Sep 2024	24 Sep 2024	
			BH08_1.5	QC02		BH08_1.5	QA02		MW04_3.0	QC01		MW04_3.0	QA01		BH10_1.5	QC03		BH10_1.5	QA03	
			EM2416721	EM2416721		EM2416721	1146138		EM2416721	EM2416721		EM2416721	1146138		EM2416721	EM2416721		EM2416721	1146138	
			Soil	Soil		Soil	Soil		Soil	Soil		Soil	Soil		Soil	Soil		Soil	Soil	
			Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D		Normal	Field_D		Normal	Interlab_D	
Misc.	Unit	EQL																		
% Moisture	%	1	-	-	-	-	7.6	-	-	-	-	-	17	-	-	-	-	-	11	-
Inorganics																				
Moisture (%)	%	0.1	14.6	7.6	63	14.6	-	-	18.2	17.7	3	18.2	-	-	10.4	8.2	24	10.4	-	-
PFAS - Perfluoroalkyl Sulfonic Acids																				
Perfluorobutane sulfonic acid (PFBS)	mg/kg	0.0002	0.0004	0.0010	86	0.0004	<0.005	0	0.0043	0.0039	10	0.0043	<0.005	0	0.0017	0.0019	11	0.0017	<0.005	0
Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorononane sulfonate (PFNS)	mg/kg	0.005	-	-	-	-	<0.005	-	-	-	-	-	<0.005	-	-	-	-	-	<0.005	-
Perfluorooheptane sulfonic acid (PFHpS)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0008	0.0007	13	0.0008	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	0.0070	0.0268	117	0.0070	0.015 ^{#3}	73	0.0129	0.0130	1	0.0129	0.034 ^{#3}	90	0.0008	0.0009	12	0.0008	<0.005 ^{#3}	0
Perfluoropropanesulfonic acid (PFPrS)	mg/kg	0.005	-	-	-	-	<0.005	-	-	-	-	-	<0.005	-	-	-	-	-	<0.005	-
Perfluoropentane sulfonic acid (PFPeS)	mg/kg	0.0002	0.0004	0.0005	22	0.0004	<0.005	0	0.0043	0.0041	5	0.0043	<0.005	0	0.0012	0.0025	70	0.0012	<0.005	0
Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002	0.0010	0.0036	113	0.0010	<0.005	0	0.0249	0.0236	5	0.0249	0.033	28	0.0057	0.0157	93	0.0057	<0.005	13
PFAS - Perfluoroalkyl Carboxylic Acids																				
Perfluorobutanoic acid (PFBA)	mg/kg	0.001	<0.001	0.001	0	<0.001	<0.005	0	<0.001	<0.001	0	<0.001	<0.005	0	<0.001	0.001	0	<0.001	<0.005	0
Perfluorodecanoic acid (PFDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorododecanoic acid (PFDoDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorooheptanoic acid (PFHpA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0007	0.0007	0	0.0007	<0.005	0	<0.0002	0.0006	100	<0.0002	<0.005	0
Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002	0.0004	0.0009	77	0.0004	<0.005	0	0.0076	0.0075	1	0.0076	0.011	37	0.0041	0.0077	61	0.0041	<0.005	0
Perfluorononanoic acid (PFNA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	0.0012	0.0011	9	0.0012	<0.005	0	0.0002	0.0007	111	0.0002	<0.005	0
Perfluoropentanoic acid (PFPeA)	mg/kg	0.0002	0.0003	0.0008	91	0.0003	<0.005	0	0.0015	0.0017	12	0.0015	<0.005	0	0.0008	0.0015	61	0.0008	<0.005	0
Perfluorotetradecanoic acid (PFTeDA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
Perfluorotridecanoic acid (PFTriDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
Perfluoroundecanoic acid (PFUnDA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
PFAS - Perfluoroalkyl Sulfonamide																				
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	0
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Methyl perfluorooctane sulfonamide (MeFOSA)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	0	<0.0002	<0.0002	0	<0.0002	<0.01	0
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0	<0.0002	<0.0002	0	<0.0002	<0.005	0
PFAS - Fluorotelomer Sulfonic Acids																				
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.01	0	<0.0005	<0.0005	0	<0.0005	<0.01	0	<0.0005	<0.0005	0	<0.0005	<0.01	0
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	mg/kg	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0	<0.0005	<0.0005	0	<0.0005	<0.005	0
PFAS - Sums																				
PFAS (Sum of Total)	mg/kg	0.0002	0.0095	0.0346	114	0.0095	<0.05	0	0.0582	0.0563	3	0.0582	0.078	29	0.0145	0.0325	77	0.0145	<0.05	0
PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002	0.0091	0.0341	116	0.0091	0.015	49	0.0531	0.0515	3	0.0531	0.078	38	0.0133	0.0300	77	0.0133	<0.01	28
Sum of US EPA PFAS (PFOS + PFOA)*	mg/kg	0.005	-	-	-	-	0.015	-	-	-	-	-	0.034	-	-	-	-	-	<0.005	-
Sum of PFHxS and PFOS	mg/kg	0.0002	0.0080	0.0304	117	0.0080	0.015	61	0.0378	0.0366	3	0.0378	0.067	56	0.0065	0.0166	87	0.0065	<0.005	26
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	mg/kg	0.005	-	-	-	-	0.015	-	-	-	-	-	0.067	-	-	-	-	-	<0.005	-

Comments

- #1 This is the higher criterion for (the existing ecological indirect exposure) intensely developed sites with no secondary consumers and minimal potential for indirect ecological exposure. For indicative purposes only.
- #2 If the concentration of PFHxS > PFOS this guideline value needs to be adjusted accordingly. Please refer to Section 8.5.2.1 of the PFAS NEMP 2.0 guideline for further information
- #3 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Environmental Standards

HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological direct exposure

HEPA, Jan 2020, PFAS NEMP 2.0 2020 Ecological indirect exposure – Developed sites

HEPA, Jan 2020, PFAS NEMP 2.0 2020 Residential w/ min opportunities for soil access (HIL B)

28/06/2023, SA MFS Site Specific Criteria - Regional (Retained)

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 30 (1 - 10 x EQL); 30 (10 - 30 x EQL); 30 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory



Location Code	Date	Field ID	Lab Report Number	Matrix Type	Sample Type	MW04	09 Oct 2024	09 Oct 2024	RPD	MW04	09 Oct 2024	09 Oct 2024	RPD
						MW04	FD01	MW04		FS01			
						EM2417600	EM2417600	EM2417600		1148893			
						Water	Water	Water		Water			
						Normal	Field_D	Normal		Interlab_D			
Acidity & Alkalinity	Unit	EQL											
Alkalinity (Carbonate as CaCO3)	mg/L	1	<1	-	-	<1	-	-					
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	2,050	-	-	2,050	-	-					
Alkalinity (Hydroxide as CaCO3)	mg/L	1	<1	-	-	<1	-	-					
Alkalinity (total as CaCO3)	mg/L	1	2,050	-	-	2,050	-	-					
Major Ions													
Calcium (filtered)	mg/L	1	136	-	-	136	-	-					
Magnesium (filtered)	mg/L	1	450	-	-	450	-	-					
Potassium (filtered)	mg/L	1	313	-	-	313	-	-					
Sodium (filtered)	mg/L	1	6,170	-	-	6,170	-	-					
Chloride	mg/L	1	8,830	-	-	8,830	-	-					
Sulfate (filtered)	mg/L	1	1,400	-	-	1,400	-	-					
Cations Total	meq/L	0.01	320	-	-	320	-	-					
Anions Total	meq/L	0.01	319	-	-	319	-	-					
Ionic Balance	%	0.01	0.16	-	-	0.16	-	-					
Nutrients													
Ammonia as N	mg/L	0.01	2.73	-	-	2.73	-	-					
Nitrate (as N)	mg/L	0.01	10.1	-	-	10.1	-	-					
Nitrite (as N)	mg/L	0.01	0.20	-	-	0.20	-	-					
Nitrogen (Total Oxidised) (as N)	mg/L	0.01	10.3	-	-	10.3	-	-					
Metals													
Arsenic	mg/L	0.001	0.063	-	-	0.063	-	-					
Arsenic (filtered)	mg/L	0.001	0.008	-	-	0.008	-	-					
Cadmium	mg/L	0.0001	0.0001	-	-	0.0001	-	-					
Cadmium (filtered)	mg/L	0.0001	<0.0001	-	-	<0.0001	-	-					
Chromium (III+VI)	mg/L	0.001	0.061	-	-	0.061	-	-					
Chromium (III+VI) (filtered)	mg/L	0.001	0.010	-	-	0.010	-	-					
Copper	mg/L	0.001	0.053	-	-	0.053	-	-					
Copper (filtered)	mg/L	0.001	0.023	-	-	0.023	-	-					
Lead	mg/L	0.001	0.022	-	-	0.022	-	-					
Lead (filtered)	mg/L	0.001	0.011	-	-	0.011	-	-					
Mercury	mg/L	0.0001	<0.0001	-	-	<0.0001	-	-					
Mercury (filtered)	mg/L	0.0001	<0.0001	-	-	<0.0001	-	-					
Nickel	mg/L	0.001	0.041	-	-	0.041	-	-					
Nickel (filtered)	mg/L	0.001	0.018	-	-	0.018	-	-					
Zinc	mg/L	0.005	0.094	-	-	0.094	-	-					
Zinc (filtered)	mg/L	0.005	0.037	-	-	0.037	-	-					
PFAS - Perfluoroalkyl Sulfonic Acids													
Perfluorobutane sulfonic acid (PFBS)	µg/L	0.0005	13.5	13.2	2	13.5	15	11					
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0					
Perfluorononane sulfonate (PFNS)	µg/L	0.001	-	-	-	-	<0.0625	-					
Perfluoroheptane sulfonic acid (PFHpS)	µg/L	0.0005	2.82	3.05	8	2.82	2.3 ⁸³	20					
Perfluorooctane sulfonic acid (PFOS)	µg/L	0.0001	36.4	35.0	4	36.4	39	7					
Perfluoropropanesulfonic acid (PFPrS)	µg/L	0.001	-	-	-	-	6.9	-					
Perfluoropentane sulfonic acid (PFPeS)	µg/L	0.0005	13.9	14.3	3	13.9	13 ⁸³	7					
Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.0005	73.7	75.3	2	73.7	80 ⁸³	8					

Location Code	Date	Field ID	Lab Report Number	Matrix Type	Sample Type	MW04	09 Oct 2024	09 Oct 2024	RPD	MW04	09 Oct 2024	09 Oct 2024	RPD
						MW04	09 Oct 2024	09 Oct 2024		MW04	FS01		
						EM2417600	EM2417600	EM2417600		1148893			
						Water	Water	Water		Water			
						Normal	Field_D	Normal		Interlab_D			
Unit	EQL												
PFAS - Perfluoroalkyl Carboxylic Acids													
Perfluorobutanoic acid (PFBA)	µg/L	0.002	3.77	3.62	4	3.77	0.46	157					
Perfluorodecanoic acid (PFDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0					
Perfluorododecanoic acid (PFDoDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0					
Perfluoroheptanoic acid (PFHpA)	µg/L	0.0005	3.20	3.13	2	3.20	2.7 ^{#3}	17					
Perfluorohexanoic acid (PFHxA)	µg/L	0.0005	31.1	30.3	3	31.1	33	6					
Perfluorononanoic acid (PFNA)	µg/L	0.0005	0.0377	0.0364	4	0.0377	<0.0625	0					
Perfluorooctanoic acid (PFOA)	µg/L	0.0005	4.66	4.56	2	4.66	4.1 ^{#3}	13					
Perfluoropentanoic acid (PFPeA)	µg/L	0.0005	7.04	6.91	2	7.04	5.9	18					
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.0005	<0.0008 ^{#2}	<0.0008 ^{#2}	0	<0.0008 ^{#2}	<0.001	0					
Perfluorotridecanoic acid (PFTriDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0					
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.001	0					
PFAS - Perfluoroalkyl Sulfonamide													
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0					
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0					
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0					
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0					
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	µg/L	0.0005	<0.0005	<0.0005	0	<0.0005	<0.005	0					
N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.005	0					
Perfluorooctane sulfonamide (FOSA)	µg/L	0.0005	0.0097	0.0097	0	0.0097	0.013 ^{#3}	29					
PFAS - Fluorotelomer Sulfonic Acids													
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0					
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0					
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.001	1.80	1.89	5	1.80	2.1	15					
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.001	<0.001	<0.001	0	<0.001	<0.001	0					
PFAS - Sums													
PFAS (Sum of Total)	µg/L	0.0002	198	197	1	198	204.473	3					
PFAS (Sum of Total)/WA DER List	µg/L	0.0002	175	174	1	175	182.26	4					
Sum of US EPA PFAS (PFOS + PFOA)*	µg/L	0.001	-	-	-	-	43.1	-					
Sum of PFHxS and PFOS	µg/L	0.0002	110	110	0	110	119	8					
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	µg/L	0.001	-	-	-	-	123.1	-					

Comments

#1 For indicative purposes only

#2 Reported Analyte LOR is higher than Requested Analyte LOR

#3 Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.

Environmental Standards

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 95%-slightly-moderately disturbed system

HEPA, January 2020, PFAS NEMP 2.0 2020 Interim marine - 99% - high conservation value system

HEPA, Jan 2020, PFAS NEMP 2.0 2020 Recreational Water

*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



	PFAS - Perfluoroalkyl Sulfonic Acids								PFAS - Perfluoroalkyl Carboxylic Acids							
	Perfluorobutane sulfonic acid (PFBS)	Perfluorodecanesulfonic acid (PFDS)	Perfluorononane sulfonate (PFNS)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluorooctane sulfonic acid (PFOS)	Perfluoropropanesulfonic acid (PFPrS)	Perfluoropentane sulfonic acid (PFPeS)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorobutanoic acid (PFBA)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctanoic acid (PFOA)	Perfluoropentanoic acid (PFPeA)
	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	0.0005	0.02	0.02	0.02	0.0002	0.02	0.02	0.0005	0.002	0.02	0.02	0.0005	0.0005	0.02	0.0005	0.0005

Date	Field ID	Lab Report Number															
23 Sep 2024	FB01	EM2416721	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.01	<0.10	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
23 Sep 2024	RB01	EM2416721	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.01	<0.10	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
24 Sep 2024	FB02	EM2416721	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.01	<0.10	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
24 Sep 2024	RB02	EM2416721	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.01	<0.10	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
09 Oct 2024	FB01	EM2417600	<0.0005	-	-	-	<0.0002	-	-	<0.0005	<0.0020	-	-	<0.0005	<0.0005	-	<0.0005
09 Oct 2024	RB01	EM2417600	<0.0005	-	-	-	<0.0002	-	-	<0.0005	<0.0020	-	-	<0.0005	<0.0005	-	<0.0005

Statistics

Number of Results	6	4	4	4	6	4	4	6	6	4	4	6	6	4	6	6
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.0005	<0.02	<0.02	<0.02	<0.0002	<0.02	<0.02	<0.0005	<0.002	<0.02	<0.02	<0.0005	<0.0005	<0.02	<0.0005	<0.0005
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.01	<0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration *	0.0068	0.01	0.01	0.01	0.0034	0.01	0.01	0.0034	0.034	0.01	0.01	0.0068	0.0068	0.01	0.0034	0.0068
Geometric Average *	0.0029	0.01	0.01	0.01	0.0014	0.01	0.01	0.0018	0.014	0.01	0.01	0.0029	0.0029	0.01	0.0018	0.0029
Median Concentration *	0.01	0.01	0.01	0.01	0.005	0.01	0.01	0.005	0.05	0.01	0.01	0.01	0.01	0.01	0.005	0.01
Standard Deviation *	0.005	0	0	0	0.0025	0	0	0.0025	0.025	0	0	0.005	0.005	0	0.0025	0.005
Geometric Standard Deviation *	6.7	1	1	1	7.5	1	1	4.7	7.5	1	1	6.7	6.7	1	4.7	6.7
95% UCL (Student's-t) *	0.0109	0.01	0.01	0.01	0.00545	0.01	0.01	0.00543	0.0545	0.01	0.01	0.0109	0.0109	0.01	0.00543	0.0109
% of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Non-Detects	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

* A Non Detect Multiplier of 0.5 has been applied.



					PFAS - Perfluoroalkyl Sulfonamide							PFAS - Fluorotelomer Sulfonic Acids				PFAS - Sums		
	Perfluorobutane sulfonic acid (PFBS)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl perfluorooctane sulfonamide (MeFOSA)	N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	N-Methyl perfluorooctane sulfonamidoethanol (MEFOSE)	Perfluorooctane sulfonamide (FOSA)	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer Sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)	Sum of PFHxS and PFOS
	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	0.0005	0.05	0.02	0.02	0.05	0.02	0.05	0.05	0.02	0.05	0.02	0.001	0.001	0.001	0.001	0.01	0.0002	0.0002

Date	Field ID	Lab Report Number																		
23 Sep 2024	FB01	EM2416721	<0.02	<0.05	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01
23 Sep 2024	RB01	EM2416721	<0.02	<0.05	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01
24 Sep 2024	FB02	EM2416721	<0.02	<0.05	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01
24 Sep 2024	RB02	EM2416721	<0.02	<0.05	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01
09 Oct 2024	FB01	EM2417600	<0.0005	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	<0.0002	<0.0002
09 Oct 2024	RB01	EM2417600	<0.0005	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	-	<0.0002	<0.0002

Statistics

Number of Results	6	4	4	4	4	4	4	4	4	4	4	6	6	6	6	4	6	6
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Concentration	<0.0005	<0.05	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.02	<0.001	<0.001	<0.001	<0.001	<0.01	<0.0002	<0.0002
Minimum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	<0.02	<0.05	<0.02	<0.02	<0.05	<0.02	<0.05	<0.05	<0.02	<0.05	<0.02	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01
Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration *	0.0068	0.025	0.01	0.01	0.025	0.01	0.025	0.025	0.01	0.025	0.01	0.017	0.017	0.017	0.017	0.005	0.0034	0.0034
Geometric Average *	0.0029	0.025	0.01	0.01	0.025	0.01	0.025	0.025	0.01	0.025	0.01	0.0068	0.0068	0.0068	0.0068	0.005	0.0014	0.0014
Median Concentration *	0.01	0.025	0.01	0.01	0.025	0.01	0.025	0.025	0.01	0.025	0.01	0.025	0.025	0.025	0.025	0.005	0.005	0.005
Standard Deviation *	0.005	0	0	0	0	0	0	0	0	0	0	0.013	0.013	0.013	0.013	0	0.0025	0.0025
Geometric Standard Deviation *	6.7	1	1	1	1	1	1	1	1	1	1	7.5	7.5	7.5	7.5	1	7.5	7.5
95% UCL (Student's-t) *	0.0109	0.025	0.01	0.01	0.025	0.01	0.025	0.025	0.01	0.025	0.01	0.0272	0.0272	0.0272	0.0272	0.005	0.00545	0.00545
% of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Non-Detects	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

* A Non Detect Multiplier of 0.5 has been applied.

